

FORM PTO-1390 (REV 11-98)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER PF82PCTSEQ/dln	
<b>TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371</b>				U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold;">097 647 309</div>	
INTERNATIONAL APPLICATION NO. PCT/FR99/00703		INTERNATIONAL FILING DATE 26 March 1999 (26.03.99)		PRIORITY DATE CLAIMED 27 March 1998 (27.03.98)	
TITLE OF INVENTION USE OF ACTIVE P40 CONJUGATES FOR NASAL DELIVERY					
APPLICANT(S) FOR DO/EO/US Christine Andreoni, Isabelle Rauzy, Thien N'Guyen, Jean-Francois Haeuw and Thierry Baussant					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</li> <li>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))           <ol style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</li> <li>b. <input type="checkbox"/> has been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li>6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))           <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</li> <li>b. <input type="checkbox"/> have been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input checked="" type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</li> <li>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>					
<b>Items 11. to 16. below concern document(s) or information included:</b>					
<ol style="list-style-type: none"> <li>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment.  <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li>14. <input type="checkbox"/> A substitute specification.</li> <li>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li>16. <input checked="" type="checkbox"/> Other items or information:            PCT/IB/301 and 304         </li> </ol>					

U.S. APPLICATION NO. <b>09/847309</b>		INTERNATIONAL APPLICATION NO. <b>PCT/FR99/00703</b>		ATTORNEY'S DOCKET NUMBER <b>PF82PCTSEQ/dln</b>	
---------------------------------------	--	---	--	---	--

<p>17. <input type="checkbox"/> The following fees are submitted:</p> <p><b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :</b></p> <p>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... <b>\$970.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... <b>\$840.00</b></p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... <b>\$760.00</b></p> <p>International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... <b>\$670.00</b></p> <p>International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... <b>\$96.00</b></p> <p style="text-align: center;"><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b></p> <p>Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">CLAIMS</th> <th style="width: 25%;">NUMBER FILED</th> <th style="width: 25%;">NUMBER EXTRA</th> <th style="width: 35%;">RATE</th> </tr> <tr> <td>Total claims</td> <td>19 - 20 =</td> <td></td> <td>X \$18.00</td> </tr> <tr> <td>Independent claims</td> <td>2 - 3 =</td> <td></td> <td>X \$78.00</td> </tr> <tr> <td colspan="3">MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td> <td>+ \$260.00</td> </tr> <tr> <td colspan="3"><b>TOTAL OF ABOVE CALCULATIONS =</b></td> <td><b>\$ 970</b></td> </tr> <tr> <td colspan="3">Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).</td> <td>\$</td> </tr> <tr> <td colspan="3"><b>SUBTOTAL =</b></td> <td><b>\$ 970</b></td> </tr> <tr> <td colspan="3">Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).</td> <td>\$</td> </tr> <tr> <td colspan="3"><b>TOTAL NATIONAL FEE =</b></td> <td><b>\$ 970</b></td> </tr> <tr> <td colspan="3">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property</td> <td>+</td> </tr> <tr> <td colspan="3"><b>TOTAL FEES ENCLOSED =</b></td> <td><b>\$ 970</b></td> </tr> <tr> <td colspan="3"></td> <td>Amount to be:</td> </tr> <tr> <td colspan="3"></td> <td>refunded</td> </tr> <tr> <td colspan="3"></td> <td>charged</td> </tr> </table>				CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	19 - 20 =		X \$18.00	Independent claims	2 - 3 =		X \$78.00	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	<b>TOTAL OF ABOVE CALCULATIONS =</b>			<b>\$ 970</b>	Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).			\$	<b>SUBTOTAL =</b>			<b>\$ 970</b>	Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			\$	<b>TOTAL NATIONAL FEE =</b>			<b>\$ 970</b>	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property			+	<b>TOTAL FEES ENCLOSED =</b>			<b>\$ 970</b>				Amount to be:				refunded				charged	<p style="text-align: center;"><b>CALCULATIONS PTO USE ONLY</b></p>	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE																																																										
Total claims	19 - 20 =		X \$18.00																																																										
Independent claims	2 - 3 =		X \$78.00																																																										
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00																																																										
<b>TOTAL OF ABOVE CALCULATIONS =</b>			<b>\$ 970</b>																																																										
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).			\$																																																										
<b>SUBTOTAL =</b>			<b>\$ 970</b>																																																										
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			\$																																																										
<b>TOTAL NATIONAL FEE =</b>			<b>\$ 970</b>																																																										
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property			+																																																										
<b>TOTAL FEES ENCLOSED =</b>			<b>\$ 970</b>																																																										
			Amount to be:																																																										
			refunded																																																										
			charged																																																										

a. ☒ A check in the amount of \$ 970.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.


c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 8-3220. A duplicate copy of this sheet is enclosed.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:



**25666**

PATENT TRADEMARK OFFICE

*G. Patrick Sage*

SIGNATURE:

G. Patrick Sage

---

NAME

37,710

---

REGISTRATION NUMBER



09-28-00

09/647309

428 Rec'd PCT/PTO 27 SEP 2000

\* \* \* \* \*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

\* \* \* \* \*

Case No. PF82PCTSEQ/dln

Application for Letters Patent

Applicant(s): Christine Andreoni, et al.

Title : USE OF ACTIVE P40 CONJUGATES FOR NASAL DELIVERY

09/647309

---

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)

"Express Mail" No.: EL 455869358US

Date of Deposit: \_\_\_\_\_

I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Diane L. Newton

Name of person mailing paper

Signature

---

\* \* \* \* \*

PF82PCTSEQ/dln

Applicant : Christine Andreoui, et al.  
Title : USE OF ACTIVE P40 CONJUGATES FOR NASAL  
DELIVERY

\* \* \* \* \*

Honorable Commissioner of Patents and Trademarks  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

As soon as the Serial No. and Filing Date have been accorded  
the above-identified application, kindly enter the following  
amendments:

IN THE SPECIFICATION: Kindly delete the paper Sequence Listing,  
separately labelled as pages 1 through 27, found between the  
drawings and the Search Report and replace by the paper Sequence  
Listing, page numbers 16 through 73, provided herewith.

IN THE CLAIMS: Kindly cancel claims pages 16, 17, and 18 and  
replace by claims pages 74, 75, and 76.

R E M A R K S

The claims have been amended to conform to accepted U.S.  
practice.

A new paper Sequence Listing is provided and is inserted  
into the proper place in the application. This new listing does  
not contain any new matter. The Sequence Listing has been put  
into the PatentIn format and merely contains both nucleic and  
amino acid sequences, whereas the originally-filed PCT Sequence  
Listing contained a combined listing.

The computer readable Sequence Listing shall follow under  
separate cover as will the Declaration by the inventors.

RECEIVED 09/27/2000

Entry of the present amendments and early and favorable action on the merits of this application are respectfully solicited.

Respectfully submitted,

THE FIRM OF HUESCHEN & SAGE

  
G. PATRICK SAGE, Attorney #37,710

Dated: September 27, 2000  
Customer No. 25,666  
616-382-0030

Enclosures:      Return postal card receipt  
New Claims pages 74, 75, and 76  
Paper Sequence Listing pages 16 through 73

RECEIVED

USE OF ACTIVE P40 CONJUGATES FOR NASAL DELIVERY

The present invention relates to the production of immunizing preparations which are effective in nasal administration. It thus relates to the use of carrier proteins which can improve the immune response to a hapten when the hapten/carrier protein conjugate is administered nasally.

The use of vaccine for oral or nasal delivery is thought to have a great influence on the eradication of pathogenic microorganisms. Specifically, any modification of a vaccine which allows it to be used with greater flexibility (heat-stability, distribution without syringes, etc.), would result in a more effective and more widely used vaccination. On the other hand, immunization via the mucous membrane pathways makes it possible to induce a local immunity which constitutes the first barrier against invasion by a microorganism.

Currently, the oral vaccines which are on the market only concern attenuated or recombined live vectors:

- tetravalent oral vaccine against polio,
- oral vaccine against typhoid fever.

Approaches for nasal or oral vaccination are already described in the literature.

Tests have thus been carried out on mucosal administrations of PspA, which corresponds to the surface protein A of *Pneumococcus* (Briles D.E., patent EP 0,682,950), on hemagglutinin filaments (Capron A., patent FR 2,718,750; Kimura A., patent EP 0,471,177; Shahin R.D., US patent 7532327), on a fragment of the tetanus toxin (Dougan G., patent WO 93/21950) and on cholera toxin B (CTB).

A protein of the external membrane of *Neisseria meningitidis* is used, mixed with the hapten as an adjuvant for a nasal immunization (Van de Verg L.L., *Infection and immunity*, 1996, 64: 5263-5268).

Unexpectedly, the Applicant has now found that a membrane protein originating from another bacterium makes it possible, when it is administered nasally together with an antigen, to induce an immune response of satisfactory strength and quality for the production of a vaccine.

For this reason, the subject of the present invention is the use of at least one fragment of an enterobacterium membrane protein OmpA for preparing a pharmaceutical composition intended to be administered nasally, to improve the immunity of a mammal with respect to an antigen or to a hapten.

In the present invention, the term "OmpA" is intended to refer to the type A proteins of the external membrane (OmpA for Outer membrane protein A).

A subject of the invention is also the use of at least one fragment of a membrane protein of *Klebsiella* for preparing a pharmaceutical composition intended to be administered nasally, to improve the immunity of a mammal with respect to an antigen or to a hapten.

Preferably, the membrane protein is an OmpA protein of *Klebsiella pneumoniae*.

Advantageously, said fragment of the enterobacterium membrane protein OmpA or of the *Klebsiella* membrane protein according to the invention is obtained by recombinant process.

Very advantageously, said membrane protein or its fragment, obtained by recombinant process, is, after extraction, renatured in the presence of detergent chosen from Zwittergent 3-14, Zwittergent 3-12 and octylglycopyranoside, preferably in the presence of Zwittergent 3-14 at a concentration of between 0.05% and 2% (w/v), very preferably at a concentration close to 0.1%.

Application WO 96/14415 has shown that the major membrane protein of *Klebsiella pneumoniae*, which is the OmpA named P40, coupled to peptide subunit antigens is very immunogenic via the systemic route.

The recombinant P40 protein, expressed in E.Coli in the form of inclusion bodies, is named rP40.

In the context of the present invention, a particularly suitable protein comprises the sequence  
5 SEQ ID No 1.

The Applicant has demonstrated that an anti-P40 antibody response is found in all adults, the enterobacterium *Klebsiella pneumoniae* being a very widespread pathogen. This sensitization favors an  
10 increase in the antibody response directed against an antigen or a hapten which is administered while coupled to the carrier protein P40. The administration is carried out nasally in the absence of adjuvant.

Said antigen or hapten according to the  
15 invention can be chosen from the group comprising proteins, peptides, polysaccharides, oligosaccharides and nucleic acids. Advantageously, it is of bacterial or viral origin.

The present invention is thus suitable for  
20 preparing vaccine directed against any microorganism responsible for pathologies of the airways, such as for example microorganisms chosen from RSV, parainfluenzae virus (PIV), influenza virus, hantavirus, streptococci, pneumococci and meningococci.

The antigen or hapten according to the  
25 invention will comprise at least one fragment of said microorganism, such as a protein fragment, which persons skilled in the art will know how to determine for its capacity to confer the desired immunity, by  
30 standard techniques such as those described in the examples below.

In particular, the present invention is suitable for preparing vaccine directed against RSV (or respiratory syncytial virus), in particular human or  
35 bovine RSV. In this case, the antigen or hapten according to the invention comprises at least one protein fragment of the virus RSV, and in particular at least one fragment of the protein G of the RSV.

The sequences of such fragments have in particular been described in application WO 95/27787.

Preferably, said protein fragments of the virus RSV are chosen from the fragments having the sequences  
5 SEQ ID No 2 to SEQ ID No 74 as amino acid sequences.

Sequences which are suitable for preparing a vaccine according to the invention are the sequences SEQ ID No 2 to SEQ ID No 74.

The chemical conjugates derived from the  
10 coupling of peptides to at least one fragment of a membrane protein of *Klebsiella*, such as rP40, give good results, and an evaluation of the immune response shows very strong antibody responses against these peptides after presensitization with *Klebsiella pneumoniae*.

Advantageously, the protein fragment  
15 originating from enterobacteria membrane protein OmpA or from membrane protein of *Klebsiella* is covalently coupled to the antigen or hapten, such as a protein fragment of the RSV.

The invention also comprises the use of at  
20 least one fragment of an enterobacteria membrane protein OmpA or of a membrane protein of *Klebsiella* according to the invention, characterized in that said fragment is covalently coupled to said antigen or  
25 hapten.

According to the invention, it is possible to introduce one or more bonding elements, in particular amino acids, to facilitate the coupling reactions between the fragment of membrane protein and the  
30 antigen or hapten.

The covalent coupling of the antigen or hapten according to the invention can be carried out at the N- or C-terminal end of the fragment of the membrane protein according to the invention. The bifunctional  
35 reagents which allow this coupling can be determined as a function of the end of the fragment of the membrane protein which is chosen to perform the coupling, and of the nature of the antigen or hapten to be coupled.

These coupling techniques are well known to persons skilled in the art.

The conjugates derived from the coupling of peptides to at least one fragment of an enterobacteria membrane protein OmpA or of a membrane protein of Klebsiella can be prepared by genetic recombination. The hybrid protein (conjugate) can in fact be produced by recombinant DNA techniques, by insertion or addition of a sequence encoding the antigenic or hapten peptide(s) into or to the DNA sequence encoding the fragment of membrane protein. These techniques for preparing hybrid protein by genetic recombination are well known to persons skilled in the art (cf. for example S.C. MAKRIDES, 1996, Microbiologicals Reviews, 60, 3, 512-538) and will not be developed in the present description.

Thus, the invention also comprises the use, according to the invention, characterized in that the hybrid protein, obtained after coupling between the fragment of a membrane protein and the antigen or hapten, protein in nature, is prepared by genetic recombination.

The Applicant has also shown that, in the absence of sensitization to *Klebsiella pneumoniae*, the nasal administration of a hapten coupled to at least one fragment of a membrane protein, such as the rP40 protein, in the absence of adjuvant, induced an anti-hapten antibody response.

The invention relates to the use, according to the invention, characterized in that the pharmaceutical composition contains a fragment of a membrane protein coupled to an antigen or hapten according to the invention, or a transformed host cell which is capable of expressing a hybrid recombinant protein containing a fragment of membrane protein coupled to the antigen or hapten according to the invention, in particular in the absence of adjuvant. Among the transformed host cells which are capable of expressing said hybrid protein, gram-negative bacteria such as *Klebsiella pneumoniae*,

Escherichia coli type K12 currently used in fermentation, or *E. coli* transformed with an expression vector plasmid containing a strong promoter such as the operon of the tryptophan promoter (*trp*) are preferred.

5 Also preferred are gram-positive bacteria such as the nonpathogenic staphylococci, *S. carnosus* and *S. xylosus*, since these bacteria do not produce any LPS (lipopolysaccharides) at the membrane surface. These staphylococci can be transfected with expression  
10 vectors containing promoters such as *trp*, or the secretion signal of lipase or even the secretion signal of protein A, or alternatively the signal of the promoter of *OmpA* of *Klebsiella pneumoniae*.

Finally, the invention relates to a method for  
15 preparing a protein or one of its fragments by the recombinant pathway, characterized in that the protein or its fragment is, after extraction, renatured in the presence of a solution containing a detergent chosen from Zwittergent 3-14, Zwittergent 3-12 and  
20 octylglucopyranoside, and in that said recombinant protein is not interferon  $\beta$ .

Preferably, said protein is an enterobacterium membrane protein, in particular of *OmpA* type. Very preferably, said protein is an *OmpA* of *Klebsiella*  
25 *pneumoniae*.

In the method according to the invention, the Zwittergent 3-14 will be preferably at a concentration of between 0.05% and 2%, more preferably close to 0.1%.

The following examples are intended to  
30 illustrate the invention without in any way limiting the scope thereof.

In these examples, reference will be made to the following figures:

**Figures 1A and 1B:** Analysis by SDS-PAGE electrophoresis  
35 of the rP40 protein after purification.

Figure 1A: detection with Coomassie blue

- lane 1: batch 1, 2  $\mu$ g
- lane 2: batch 1, 10  $\mu$ g
- lane 3: batch 2, 2  $\mu$ g

- lane 4: batch 2, 10 µg
- lane 5: batch 3, 2 µg
- lane 6: batch 3, 10 µg

Figure 1B: immunoblot and detection with the aid of an anti-P40 rabbit polyclonal serum

- std: molecular mass standard
- lane 1: denatured rP40, 100 ng
- lane 2: native rP40, 100 ng.

**Figure 2**: Division of the patients according to the O.D. (Optical Density) corresponding to the anti-P40 antibodies, measured by ELISA.

**Figure 3**: Anti-G1' antibody response.

**Figure 4**: Anti-rP40 antibody response.

**Figure 5**: Anti-G1' IgA-type antibody response.

**Figure 6**: Isotyping of the anti-G1' immunoglobulins obtained in secondary response.

**Figure 7**: Isotyping of the anti-G1' immunoglobulins obtained in tertiary response.

**Figure 8**: Anti-G1' total IgG-type serum antibody response.

**Figure 9**: Isotyping of the serum anti-G1' immunoglobulins after three immunizations.

**Figure 10**: Isotyping of the anti-G1' immunoglobulins from broncho-alveolar washes after three immunizations.

#### **Example 1: Cloning of rP40**

##### **Cloning of the rP40 gene:**

The gene encoding rP40 was obtained by amplification by PCR (Polymerase Chain Reaction) from the chromosomal DNA of the *Klebsiella pneumoniae* IP 1145 strain (described in patent WO 96/14415). After identification by DNA sequencing, the fragment corresponding to rP40 is cloned into diverse expression vectors, in particular the one under the control of the trp operon promoter, upstream of 9 amino acids of the leader peptide (MKAI FVLNA). The peptide sequence of rP40 is represented in the sequence listing by the sequence SEQ ID No 1. In various *E.coli* K12 strains, the rP40 protein is produced in the form of inclusion

bodies with a considerable yield (> 10%, g proteins/g of biosolids).

#### **Fermentation of rP40 fusion proteins:**

E. coli K12 transformed with the plasmid pvaLP40 is inoculated in an Erlenmeyer flask containing 250 ml of TSB (Tryptic Soy Broth, Difco) medium containing ampicillin (100 µg/ml, Sigma) and tetracycline (8 µg/ml, Sigma). This is incubated for 16 hours at  $T^{\circ} = 37^{\circ}\text{C}$  with stirring. 200 ml of this culture are inoculated in a fermenter (CHEMAP CF3000, ALFA LAVAL) containing 2 liters of culture medium. The medium contains (g/l): glycerol, 5; ammonium sulfate, 2.6; potassium dihydrogen phosphate, 3; dipotassium hydrogen phosphate, 2; sodium citrate, 0.5; yeast extract, 1; ampicillin, 0.1; tetracycline 0.008; thiamine, 0.07; magnesium sulfate, 1 and 1 ml/l of trace element solution and 0.65 ml/l of vitamin solution. The parameters which are controlled during the fermentation are: pH, stirring, temperature, degree of oxygenation, supply of combined sources (glycerol or glucose). The pH is regulated at 7.0. The temperature is fixed at  $37^{\circ}\text{C}$ . The growth is controlled by supplying with glycerol (87%) at a constant flow rate (12 ml/h) so as to maintain the dissolved oxygen tension signal at 30%. When the turbidity of the culture (measured at 580 nm) reaches the value of 80 (after approximately 24 hours of culture), protein production is induced by adding indole acrylic acid (IAA) to a final concentration of 25 mg/l. Approximately 4 hours after induction, the cells are harvested by centrifugation. The amount of biomass obtained is approximately 200 g, expressed as wet biomass.

#### **Example 2: Extraction and purification of rP40**

##### **Materials and methods**

##### **Extraction of rP40**

After centrifugation of the culture medium (4000 rpm, 10 min,  $4^{\circ}\text{C}$ ), the cells are resuspended in a 25 mM Tris-HCl buffer, pH 8.5. A treatment with

lysozyme (0.5 g/l, 1 hour/room temperature/gentle stirring) allows the release of the inclusion bodies.

The pellet of inclusion bodies obtained by centrifugation (25 min at 10,000 g at 4°C) is taken up in a 25 mM Tris-HCl buffer, pH 8.5, containing 5 mM MgCl<sub>2</sub>, and then centrifuged (15 min at 10,000 g).

The denaturation of the protein is obtained by incubating the inclusion bodies at 37°C for 2 hours in a 25 mM Tris-HCl buffer, pH 8.5, containing 7 M urea (denaturing agent) and 10 mM dithiothreitol (reduction of disulfide bridges). A centrifugation (15 min at 10,000 g) makes it possible to remove the insoluble portion of the inclusion bodies.

After dilution with 13 volumes of a 25 mM Tris-HCl buffer, pH 8.5, containing NaCl (8.76 g/l) and Zwittergent 3-14 (0.1%, w/v), the mixture is left to stand overnight at room temperature with stirring, in contact with the air (renaturation of the protein by dilution and reoxidation of the disulfide bridges).

Purification of the rP40 protein  
Anion exchange chromatography step.

After another centrifugation, the sample is dialyzed against a 25 mM Tris-HCl buffer, pH 8.5, containing 0.1% Zwittergent 3-14 (100 volumes of buffer) overnight at 4°C.

The dialyzate is loaded onto a column containing a support of strong anion exchanger type (Biorad Macro Prep High Q gel), which is equilibrated in the buffer described above at a linear flow rate of 15 cm/h. The proteins are detected at 280 nm. The rP40 protein is eluted, with a linear flow rate of 60 cm/h for an NaCl concentration of 0.6 M, in the 25 mM Tris/HCl buffer, pH 8.5; 0.1% Zwittergent 3-14.

Cation exchange chromatography step.

The fractions containing the rP40 protein are pooled and concentrated by ultrafiltration with the aid of an Amicon cell system with stirring used with a Diaflo membrane of type YM10 (cutoff threshold 10 kDa) for volumes of about 100 ml, or with the aid of a

Millipore Minitan tangential flow filtration system used with membrane plates having a cutoff threshold of 10 kDa, for larger volumes. The fraction thus concentrated is dialyzed overnight at 4°C against a  
5 20 mM citrate buffer, pH 3.0, containing 0.1% of Zwittergent 3-14.

The dialysate is loaded onto a column containing a support of strong cation exchanger type (Biorad Macro Prep High S gel), which is equilibrated  
10 in the 20 mM citrate buffer, pH 3.0, containing 0.1% of Zwittergent 3-14. The rP40 protein is eluted (rate 61 cm/h) for a 0.7 M NaCl concentration. The fractions containing the rP40 are pooled and concentrated as described above.

### 15       **Results**

Starting from a 1 liter culture, one denaturation/renaturation cycle makes it possible to obtain 300 mg of protein (estimation by assay according to the Lowry method). 75 mg of rP40 are purified after  
20 the two chromatographic steps.

As above, the rP40 protein is concentrated after purification in order to attain a final concentration of between 5 and 10 mg/ml. The electrophoretic profiles show a degree of purity of  
25 about 95% (Figure 1A). After immunoblot, the protein is specifically recognized by an anti-natural P40 monoclonal antibody obtained in mice (Figure 1B).

The condition of the protein is monitored by SDS-PAGE. Depending on its form, denatured or native,  
30 the P40 protein extracted from the membrane of *Klebsiella pneumoniae* has a characteristic electrophoretic behavior (migration). The native form ( $\beta$ -sheet structure) in fact has a lower molecular mass than the denatured form ( $\alpha$ -helix structure) under the  
35 action of a denaturing agent, such as urea or guanidine hydrochloride, or with heating to 100°C in the presence of SDS (Figure 1B). The rP40 protein is not correctly renatured at the end of renaturation, regardless of whether this is carried out in the presence or absence

of 0.1% (w/v) Zwittergent 3-14. Conversely, total renaturation is obtained after dialysis against a 25 mM Tris/HCl buffer, pH 8.5, containing 0.1% (w/v) Zwittergent 3-14. However, it should be noted that this renaturation is only obtained when the dilution step and the treatment at room temperature are themselves carried out in the presence of Zwittergent 3-14 (negative results in the absence of detergent).

**Example 3: Coupling of the G1' peptide to rP40**

**Materials and methods**

The G1' peptide is a synthetic peptide of 15 amino acids, the sequence of which is as follows (SEQ ID No 74):

N-<sub>1</sub>SIDSNNPTOWAISK<sub>15</sub>-C

Without the Cys (cysteine) residue added in the C-terminal position, this peptide (portion 1-14) corresponds to portion 174-187 of the protein G of the respiratory syncytial virus, and has, with respect to the native peptide, two major modifications which are:

- the replacement of the Cys residue at position 13 with a Ser (serine) residue,
- the replacement at positions 3 and 9 of the Cys residues, which form a disulfide bridge, with, respectively, Asp (aspartic acid) and Orn (ornithine) residues which form a lactam-type bridge.

These modifications are introduced for the purpose of removing the Cys residues of the native peptide in order to be able to carry out a one-to-one coupling of the latter to the protein via the Cys residue introduced in the C-terminal position, while at the same time maintaining the structure of the peptide with the aid of the introduction of a lactam bridge.

The coupling of the peptide to the protein is carried out using the BHA or bromo-N-hydroxysuccinimide acetate reagent (Svenson et al., 1990, Proc. Natl. Acad. Sci. USA 87, 1347, Bernatowicz and Matsueda, 1986, Anal. Biochem. 155, 95). This heterobifunctional reagent allows activation of the Lys (lysine) residues of the protein by bromoacetylation, and then coupling

of the peptide via the free thiol group carried by the Cys residue.

Firstly, the rP40 protein is activated with the BHA. The rP40 is dialyzed against a 0.1 M phosphate buffer, pH 7, containing 0.1% Zwittergent 3-14, for 24 hours at +4°C. After dialysis, the concentration is adjusted to 5 mg/ml with the aid of the same buffer, before adding BHA in a proportion of 1.2 mg (50 µl)/mg of rP40.

The whole is placed in the dark for one hour with stirring and at room temperature.

The activated rP40 is then desalified by gel filtration chromatography (elution with the abovementioned buffer). The fractions containing the bromoacetylated protein are pooled.

For the coupling, the peptide (10 mg/ml in 0.1 M phosphate buffer, pH 7, containing 0.1% Zwittergent 3-14) is added to the activated protein in a proportion of 0.4 mg/mg of protein. After saturation under a nitrogen stream, the tube is again placed in the dark for 2 hours with stirring and at room temperature.

The unbound peptide can be removed with the aid of a dialysis step or of molecular sieve chromatography.

### Results

The conjugate obtained is characterized by protein assay (BCA or LOWRY method) and by SDS-PAGE electrophoresis. The degree of coupling of the peptide to the protein is estimated by carboxymethylcysteine residue assay: the assaying of the amino acids released by hydrolysis (6N HCl) is performed by HPLC after derivatization with the aid of PITC (Pico-Tag method, Waters).

The degree of coupling determined by this method is approximately 10 G1' peptides/mole of rP40.

**Example 4: Natural immunity in adults**

Human sera derived from a clinical study are analyzed by ELISA assay in order to determine the presence of anti-P40 antibodies.

5           The results are represented in Figure 2.

          Among 113 sera tested after 400-fold dilution, 110 sera give a colorimetric signal revealing the anti-P40 IgGs. There are circulating anti-P40 antibodies in all the patients, with levels which are more or less  
10       high depending on the patient under consideration.

**Example 5: Anti-G1' antibody response after sensitizations and frequent immunizations**

BALB/c mice were or were not sensitized twice with a *Klebsiella pneumoniae* I145 strain, in order to  
15       reproduce the seropositivity found in humans. The mice are subsequently immunized nasally in the absence of adjuvant 7 days after the sensitization. This immunization is carried out with a small amount of antigen, the mice receiving 10 µg of G1' equivalent  
20       coupled to rP40. The mice receive a booster 10 and 20 days after the first immunization. A retro-orbital sinus puncture is performed on the mice 9 days after the first immunization and 10 days after each booster (secondary and tertiary responses). The serum anti-G1'  
25       (Figure 3) and anti-carrier (Figure 4) antibodies are assayed by the ELISA method.

**5.1 Assaying of anti-G1' serum IgGs**

The results are represented in Figure 3.

          In the primary response, the mice presensitized  
30       with *Klebsiella pneumoniae* and immunized with rP40-G1' are the only ones to produce anti-G1' antibodies.

          The level of anti-G1' antibodies found in the mice presensitized with *Klebsiella pneumoniae* and immunized with rP40-G1' is increased after a second  
35       immunization. In the absence of presensitization, a second immunization in the presence of the rP40-G1' conjugates induces an anti-G1' antibody response.

After three immunizations, the anti-Gl' antibody response is increased in the presensitized and non-presensitized mice.

#### 5.2 Assaying of anti-rP40 serum IgGs

5 The results are represented in Figure 4.

The anti-P40 antibody response shows that the mice were sensitized to *Klebsiella pneumoniae* in identical manner whatever the batch under consideration.

10 The immunization in the presence of rP40-Gl' conjugates slightly increases the anti-rP40 antibody response.

#### 5.3 Assaying of anti-Gl' serum IgAs

15 Secondly, we assayed the serum IgA-type anti-Gl' antibody response: immunoglobulin characteristic of immunizations carried out via the mucous membrane (nasal or oral) pathways.

The results are represented in Figure 5.

20 After a single immunization, IgAs are not detected. After two immunizations, anti-Gl' IgAs are detected essentially in mice presensitized to *Klebsiella pneumoniae* and immunized with rP40-Gl'. This response is increased by the third immunization. In the absence of sensitization, anti-Gl' IgAs are detected in  
25 mice after two immunizations with rP40-Gl' conjugates. This level of IgA is increased by the third immunization.

#### 5.4 Isotyping of anti-Gl' serum immunoglobulins

30 Two types of response can be observed, Th1 and Th2. These responses differ by the profile of cytokines produced and by their functions in the immune response. IgG1s are characteristic of a response of type Th2, and IgG2as are characteristic of a Th1 response.

35 A mixed Th1 and Th2 response profile is found only in the mice immunized with the rP40-Gl' conjugates, whether or not they are presensitized with *Klebsiella pneumoniae* (Figure 6).

After three immunizations (Figure 7), the profile remains mixed in the mice immunized with the rP40-G1' conjugates.

**Example 6: Anti-G1' antibody response after sensitizations and infrequent immunizations.**

With respect to the above protocol, the first immunization is separated from the final sensitization by a period of 3 weeks instead of one week. The anti-G1' antibodies are assayed in the sera, and, in the tertiary response, in broncho-alveolar washes, by the ELISA method.

6.1 Assaying of anti-G1' serum IgGs

As seen in Figure 8, 7 days after the first immunization, anti-G1' serum antibodies of type total IgG are detected in the mice presensitized to *Klebsiella pneumoniae* and immunized in the presence of the rP40-G1' conjugates. This antibody response is increased by the two other immunizations.

6.2 Isotyping of serum immunoglobulins

The results are represented in Figure 9.

In this case, we also observe a mixed response, we obtain in fact the same titer for IgG1 as for IgG2a (Figure 9). In addition, a high level of IgA is found in the mice presensitized to *Klebsiella pneumoniae* and immunized three weeks later in the presence of the rP40-G1' conjugates.

6.3 Isotyping of immunoglobulins from broncho-alveolar washes

In the broncho-alveolar washes, the 4 types of immunoglobulin are found only in the mice sensitized to *Klebsiella pneumoniae* and immunized 3 times in the presence of the rP40-G1' conjugates (Figure 10).

CLAIMS

1. Use of at least one fragment of an enterobacterium membrane protein OmpA for preparing a pharmaceutical composition intended to be administered nasally, to improve the immunity of a mammal with respect to an antigen or to a hapten.
2. Use of at least one fragment of a membrane protein of *Klebsiella* for preparing a pharmaceutical composition intended to be administered nasally, to improve the immunity of a mammal with respect to an antigen or to a hapten.
3. Use of at least one fragment of a membrane protein according to claim 2, characterized in that the membrane protein is an OmpA of *Klebsiella pneumoniae*.
4. Use of at least one fragment of a membrane protein according to one of claims 1 to 3, characterized in that said membrane protein or its fragment is obtained by recombinant process.
5. Use of at least one fragment of a membrane protein according to claim 4, characterized in that said recombinant membrane protein or its fragment is renatured in the presence of detergent chosen from Zwittergent 3-14, Zwittergent 3-12 and octylglucopyranoside.
6. Use of at least one fragment of a membrane protein according to one of claims 1 to 5, characterized in that at least one fragment has the sequence SEQ ID No 1.
7. Use according to one of claims 1 to 6, characterized in that the antigen or the hapten are chosen from the group comprising proteins, peptides, polysaccharides, oligosaccharides and nucleic acids.
8. Use of at least one fragment of a membrane protein according to one of claims 1 to 7, characterized in that the antigen or the hapten originate from a virus or from a bacterium.
9. Use of at least one fragment of a membrane protein according to one of claims 1 to 8,

characterized in that the antigen or the hapten comprises at least one protein fragment of a microorganism responsible for pathologies of the airways.

- 5 10. Use according to claim 9, characterized in that said microorganism responsible for pathologies of the airways is chosen from RSV, parainfluenzae virus (PIV), influenza virus, hantavirus, streptococci, pneumococci and meningococci.
- 10 11. Use of at least one fragment of a membrane protein according to one of claims 1 to 10, characterized in that the antigen or the hapten comprises at least one protein fragment of the human or bovine respiratory syncytial virus (RSV).
- 15 12. Use according to claim 11, characterized in that the antigen or hapten comprises at least one fragment of the protein G of the RSV.
13. Use according to either of claims 11 and 12, characterized in that the antigen or the hapten
- 20 comprises at least one of the sequences SEQ ID No 2 to SEQ ID No 74.
14. Use according to one of claims 1 to 13, characterized in that said fragment of a membrane protein is covalently coupled to said antigen or
- 25 hapten.
15. Use according to claim 14, characterized in that one or more bonding elements is introduced into the fragment of membrane protein and/or of the antigen or of the hapten in order to facilitate the coupling.
- 30 16. Use according to claim 15, characterized in that the bonding element introduced is an amino acid.
17. Use according to claim 14, characterized in that the hybrid protein, which is obtained after coupling between the fragment of a membrane protein and
- 35 the antigen or the hapten, when said antigen or hapten is protein in nature, is prepared by genetic recombination.
18. Use according to one of claims 14 to 17, characterized in that the pharmaceutical composition

contains a fragment of a membrane protein coupled to an antigen or a hapten.

19. Use according to claim 17, characterized in that the pharmaceutical composition contains a transformed host cell which is capable of expressing a hybrid protein containing said fragment of membrane protein coupled to said antigen or hapten.

20. Use according to either of claims 18 and 19, characterized in that the pharmaceutical composition does not contain any adjuvant.

21. Method for preparing a protein or one of its fragments by recombinant process, characterized in that said protein or one of its fragments is, after extraction, renatured in the presence of a solution comprising a detergent chosen from Zwittergent 3-14, Zwittergent 3-12 and octylglucopyranoside, and in that said recombinant protein is not interferon  $\beta$ .

- 22 -

Use of at least one fragment of a membrane protein for preparing a pharmaceutical composition intended to be administered nasally, selected from the group consisting of an enterobacterium membrane protein, an enterobacterium membrane protein OmpA, a Klebsiella membrane protein, and a Klebsiella pneumonia membrane protein OmpA useful for improving immunity of a mammal with respect to an antigen or a hapten.

- 23 -

Use of Claim 22 wherein the membrane protein or its fragment is obtained by recombinant process.

- 24 -

Use of Claim 23 wherein the recombinant membrane protein or its fragment is renatured in the presence of a detergent selected from Zwittergent 3-14, Zwittergent 3-12, and octylglucopyranoside.

- 25 -

Use of Claim 22 wherein at least one fragment has the sequence SEQ ID No 1.

- 26 -

Use of Claim 22 wherein the antigen or hapten are selected from the group consisting of proteins, peptides, polysaccharides, oligosaccharides and nucleic acids.

- 74 -

PF82PCTSEQ/dln

- 27 -

Use of Claim 26 wherein the antigen or hapten originate from a virus or a bacterium.

- 28 -

Use of Claim 27 wherein the antigen or hapten comprise at least one protein fragment of a microorganism responsible for pathologies of the airways.

- 29 -

Use of Claim 28 wherein the microorganism is selected from the group consisting of RSV, parainfluenza virus (PIV), influenza virus, hantavirus, streptococci, pneumococci and meningococci.

- 30 -

Use of Claim 26 wherein the antigen or hapten comprises at least one protein fragment of the human or bovine respiratory syncytial virus (RSV).

- 31 -

Use of Claim 30 wherein the antigen or hapten comprises at least one fragment of the G protein of the RSV.

- 32 -

Use of Claim 30 wherein the antigen or hapten comprises at least one of sequences SEQ ID No 2 through SEQ ID No 74.

- 33 -

Use of Claim 31 wherein the antigen or hapten comprises at least one of sequences SEQ ID No 3 through SEQ ID No 136.

- 34 -

Use of Claim 22 wherein the membrane protein or its fragment is covalently coupled to the antigen or hapten.

- 35 -

Use of Claim 34 wherein one or more bonding elements is introduced into the membrane protein or its fragment and/or introduced into the antigen or hapten to facilitate the coupling, forming a hybrid protein.

- 75 -

PF82PCTSEQ/dln

PF82PCTSEQ/dln

- 36 -

Use of Claim 35 wherein the bonding element introduced is an amino acid.

- 37 -

Use of Claim 36 wherein the hybrid protein, obtained after coupling between the membrane protein or its fragment and the antigen or hapten, wherein the antigen or hapten is protein in nature, is prepared by genetic recombination.

- 38 -

Use of Claim 37 including a transformed host cell which is capable of expressing a hybrid protein containing said fragment of membrane protein coupled to said antigen or hapten.

- 39 -

Use of Claim 38 which does not contain an adjuvant.

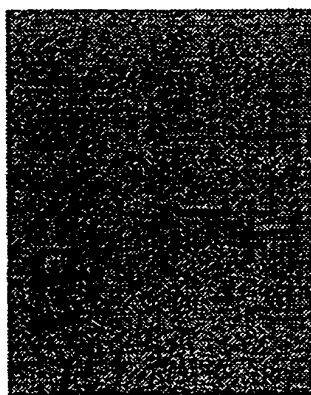
- 40 -

A method of preparing a protein or one of its fragments by recombinant process, wherein said protein or one of its fragments is, after extraction, renature in the presence of a solution comprising a detergent chosen from Zwittergent 3-14, Zwittergent 3-12 and octylglucopyranoside, and wherein said recombinant protein is not interferon  $\beta$ .



1 2 3 4 5 6

FIGURE 1A



Std 1 2

FIGURE 1B

09/647309

2/6

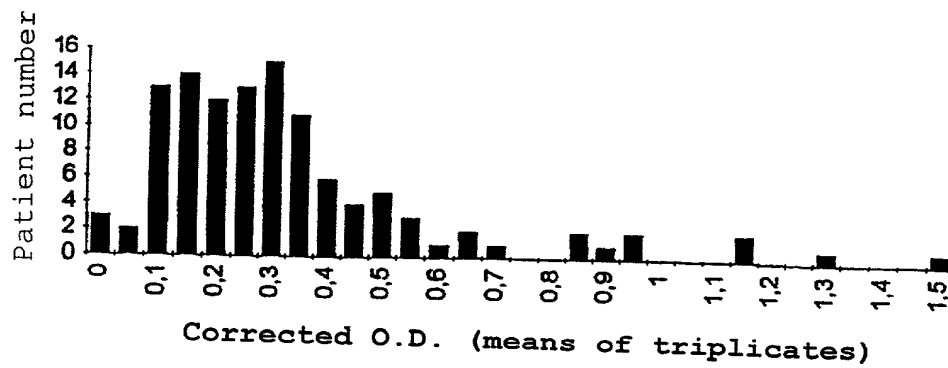


FIGURE 2

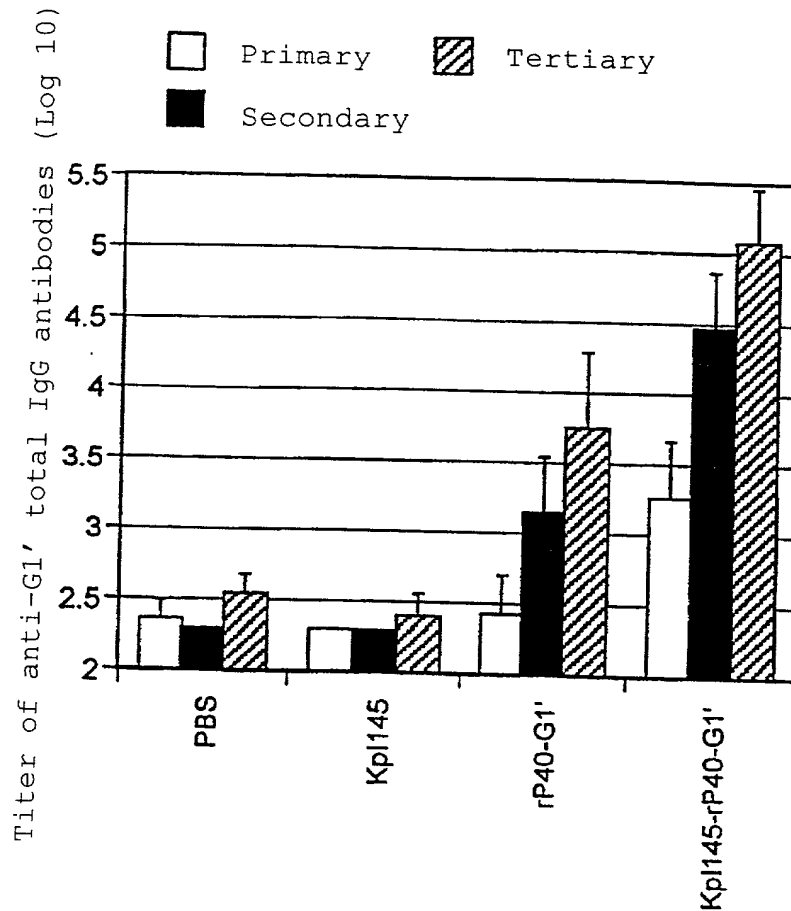


FIGURE 3

3/6

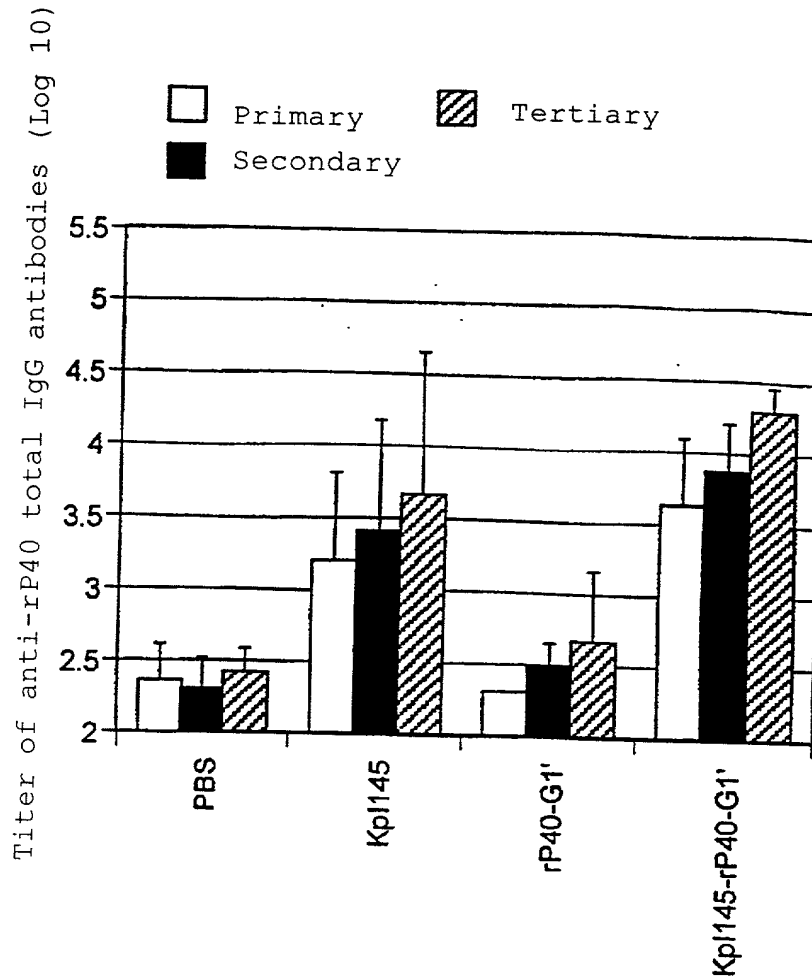


FIGURE 4

4/6

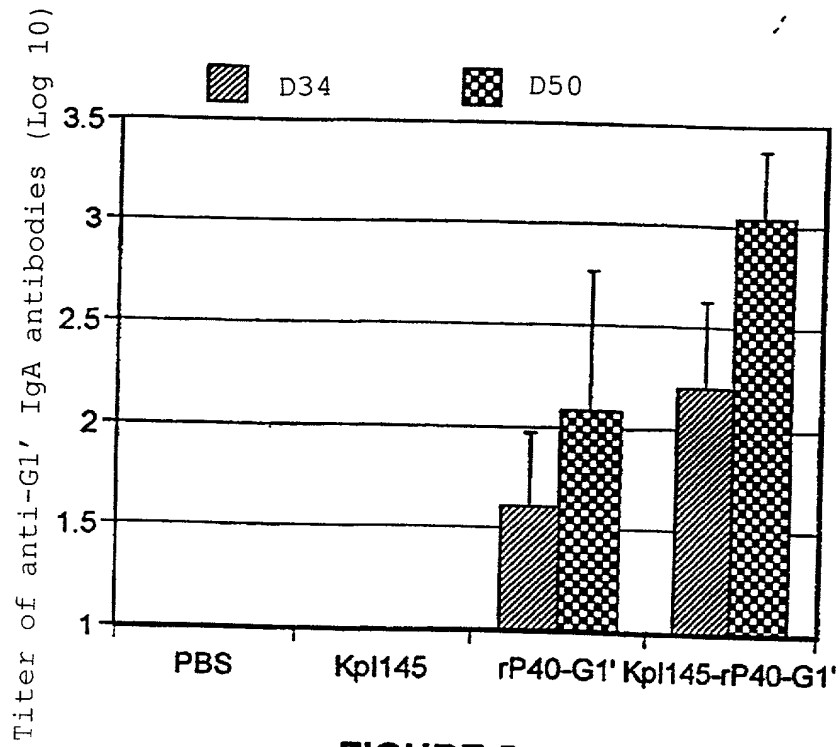


FIGURE 5

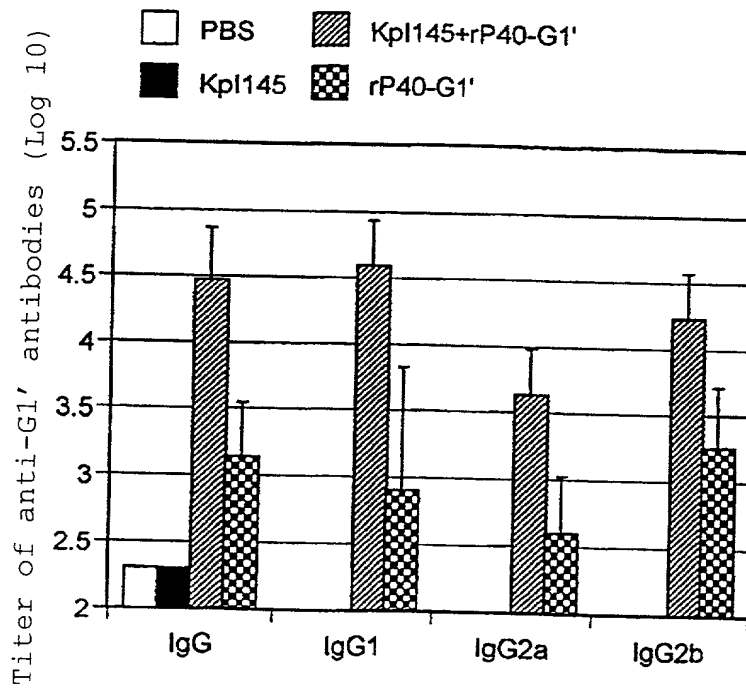


FIGURE 6

5/6

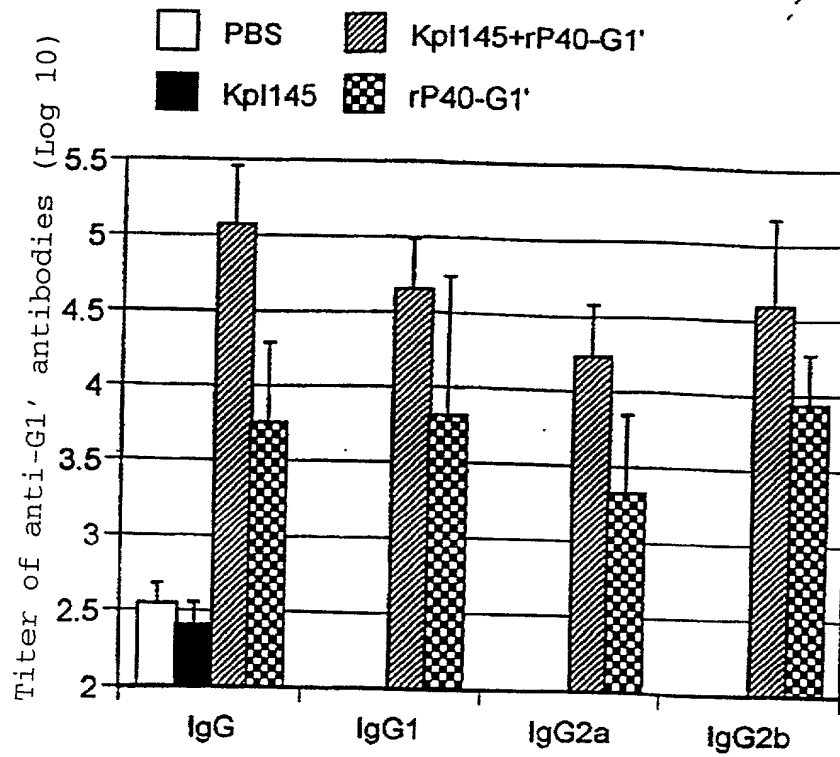


FIGURE 7

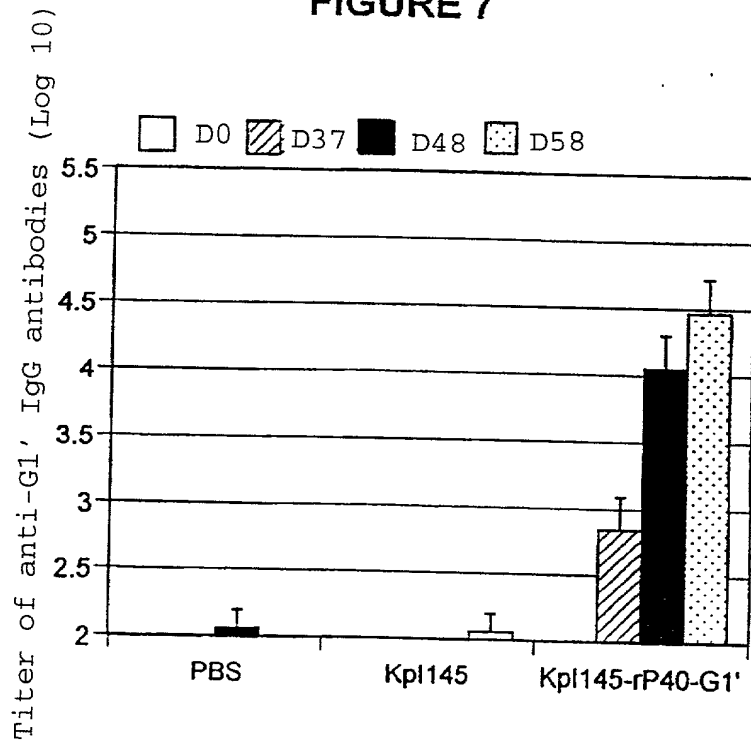


FIGURE 8

6/6

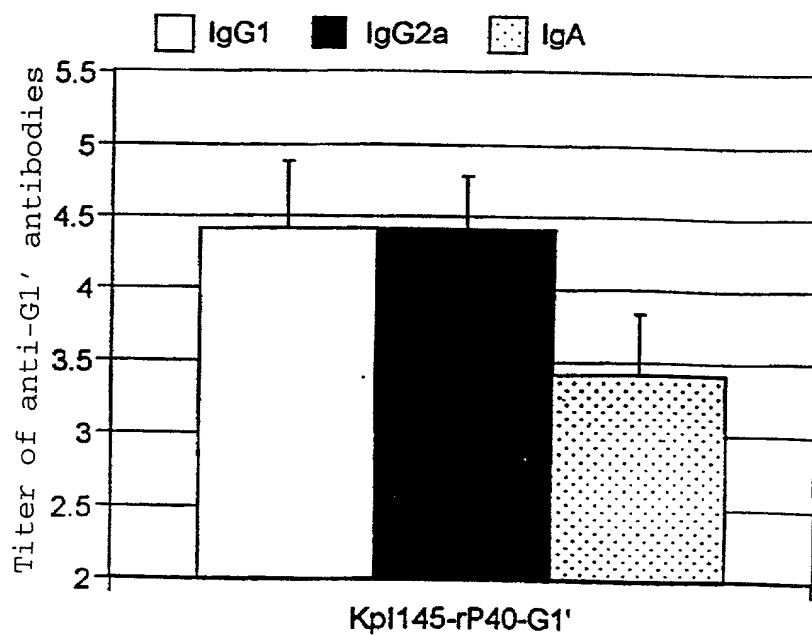


FIGURE 9

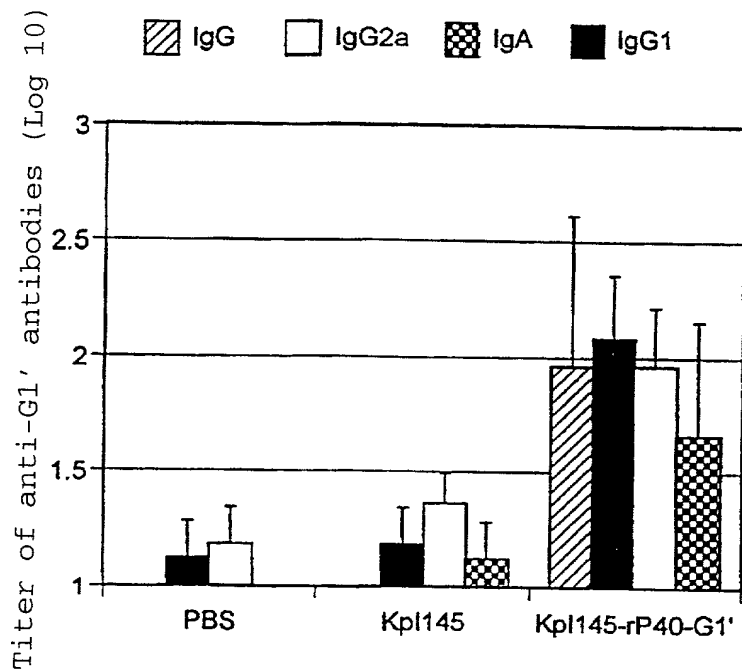
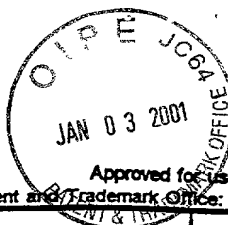


FIGURE 10



Type a plus sign (+) inside this box → ☐

Approved for use through 10/31/98  
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

PTO/SB/01 (6-95)

OMB 0651-0032

0010/PTO  
Rev. 6/95

U.S. Department of Commerce  
Patent and Trademark Office

# DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

☐ Declaration Submitted with Initial Filing OR ☒ Declaration Submitted after Initial Filing

Attorney Docket Number

PF 82 PCT Seq ju

First Named Inventor

Christine Andreoni

## COMPLETE IF KNOWN

Application Number

09/647,309

Filing Date

September 27, 2000

Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

"Use of active P40 conjugates for nasal delivery"

the specification of which

(Title of the Invention)

☐ is attached hereto  
OR

☒ was filed on (MM/DD/YYYY)

03/26/1999

as United States Application Number or PCT International

Application Number FR/99/00703

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code § 119 (a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365 (a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
98/03814	FRANCE	03.27.98	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority sheet attached hereto:

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

Burden Hour Statement: This form is estimated to take .4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231 DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

(January 1996)



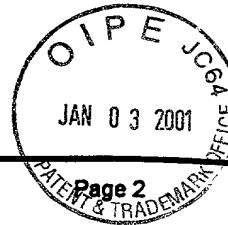
Type a plus sign (+) inside this box → ☐

## DECLARATION

## ADDITIONAL INVENTOR(S) Supplemental Sheet

Name of Additional Joint Inventor, if any:										<input type="checkbox"/> A petition has been filed for this unsigned inventor									
Given Name		Isabelle				Middle Initial				Family Name		Raully				Suffix e.g. Jr.			
Inventor's Signature										Date		12/19/2000							
Residence: City		Saix				State				Country		FRX FRANCE		Citizenship		French			
Post Office Address		9 bis, allée Boussac,																	
Post Office Address																			
City		Saix				State				Zip		81710		Country		France		Applicant Authority	
Name of Additional Joint Inventor, if any:										<input type="checkbox"/> A petition has been filed for this unsigned inventor									
Given Name		Thien				Middle Initial				Family Name		N'Guyen				Suffix e.g. Jr.			
Inventor's Signature										Date		12/19/2000							
Residence: City		St-Julien-en-Genevois				State				Country		France FRX		Citizenship		French			
Post Office Address		7 Les petits hutins, Lathoy																	
Post Office Address																			
City		St-Julien-en-Genevois				State				Zip		74160		Country		France		Applicant Authority	
Name of Additional Joint Inventor, if any:										<input type="checkbox"/> A petition has been filed for this unsigned inventor									
Given Name		Jean-Francois				Middle Initial				Family Name		Haeuw				Suffix e.g. Jr.			
Inventor's Signature										Date		12/19/2000							
Residence: City		St-Julien-en-Genevois				State				Country		France FRX		Citizenship		French			
Post Office Address		Les jardins de l'Atrium, 8 avenue de Ternier																	
Post Office Address																			
City		St-Julien-en-Genevois				State				Zip		74160		Country		France		Applicant Authority	
Name of Additional Joint Inventor, if any:										<input type="checkbox"/> A petition has been filed for this unsigned inventor									
Given Name		Thierry				Middle Initial				Family Name		Baussant				Suffix e.g. Jr.			
Inventor's Signature										Date		12/19/2000							
Residence: City		Bellegarde				State				Country		France +FRX		Citizenship		French			
Post Office Address		35, rue Jean Jaurès																	
Post Office Address																			
City		Bellegarde				State				Zip		01200		Country		France		Applicant Authority	
<input type="checkbox"/> Additional inventors are being named on supplemental sheet(s) attached hereto																			

Type a plus sign (+) inside this box → ☐



# DECLARATION

Page 2

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or §365(c) of any PCT International application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT International application numbers are listed on a supplemental priority sheet attached hereto.

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Firm Name  Customer Number or label   
☐ OR  
☐ List attorney(s) and/or agent(s) name and registration number below:

Name	Registration Number	Name	Registration Number
GORDON W. HUESCHEN	16,157		
G. PATRICK SAGE	37,710		

☐ Additional attorney(s) and/or agent(s) named on a supplemental sheet attached hereto.

Please direct all correspondence to: ☐ Customer or label Number ☐ OR ☒ Fill in correspondence address below

Name The Firm of Gordon W. Hueschen  
Address 715 The "H" Building  
Address 310 East Michigan Avenue  
City Kalamazoo State MI ZIP 49007  
Country US Telephone 616-382-0030 Fax 616-382-2030

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name	Christine	Middle Initial		Family Name	ANDREONI	Suffix e.g. Jr.	
------------	-----------	----------------	--	-------------	----------	-----------------	--

Inventor's Signature Andrew Date 12/19/2000

Residence: City Villette d'Anthon State   Country France Citizenship French

Post Office Address 6, rue des Fusains

Post Office Address 6, rue des Fusains

City Villette d'Anthon State   Zip 38280 Country FRANCE Applicant Authority  

☒ Additional inventors are being named on supplemental sheet(s) attached hereto

SEQUENCE LISTING

Information for SEQ ID NO: 1 rP40

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 344 amino acids, 1032 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

1 12  
N - Met Lys Ala Ile Phe Val Leu Asn Ala Ala Pro Lys  
5'- ATG AAA GCA ATT TTC GTA CTG AAT GCG GCT CCG AAA  
30  
Asp Asn Thr Trp Tyr Ala Gly Gly Lys Leu Gly Trp Ser Gln Tyr His Asp Thr  
GAT AAC ACC TGG TAT GCA GGT GGT AAA CTG GGT TGG TCC CAG TAT CAC GAC ACC  
48  
Gly Phe Tyr Gly Asn Gly Phe Gln Asn Asn Asn Gly Pro Thr Arg Asn Asp Gln  
GGT TTC TAC GGT AAC GGT TTC CAG AAC AAC AAC GGT CCG ACC CGT AAC GAT CAG  
66  
Leu Gly Ala Gly Ala Phe Gly Gly Tyr Gln Val Asn Pro Tyr Leu Gly Phe Glu  
CTT GGT GCT GGT GCG TTC GGT GGT TAC CAG GTT AAC CCG TAC CTC GGT TTC GAA  
84  
Met Gly Tyr Asp Trp Leu Gly Arg Met Ala Tyr Lys Gly Ser Val Asp Asn Gly  
ATG GGT TAT GAC TGG CTG GGC CGT ATG GCA TAT AAA GGC AGC GTT GAC AAC GGT  
102  
Ala Phe Lys Ala Gln Gly Val Gln Leu Thr Ala Lys Leu Gly Tyr Pro Ile Thr  
GCT TTC AAA GCT CAG GGC GTT CAG CTG ACC GCT AAA CTG GGT TAC CCG ATC ACT  
120  
Asp Asp Leu Asp Ile Tyr Thr Arg Leu Gly Gly Met Val Trp Arg Ala Asp Ser  
GAC GAT CTG GAC ATC TAC ACC CGT CTG GGC GGC ATG GTT TGG CCG GCT GAC TCC  
138  
Lys Gly Asn Tyr Ala Ser Thr Gly Val Ser Arg Ser Glu His Asp Thr Gly Val  
AAA GGC AAC TAC GCT TCT ACC GGC GTT TCC CGT AGC GAA CAC CAC ACT GGC GTT  
156  
Ser Pro Val Phe Ala Gly Gly Val Glu Trp Ala Val Thr Arg Asp Ile Ala Thr  
TCC CCA GTA TTT GCT GGC GGC GTA GAG TGG GCT GTT ACT CGT GAC ATC GCT ACC  
174  
Arg Leu Glu Tyr Gln Trp Val Asn Asn Ile Gly Asp Ala Gly Thr Val Gly Thr  
CGT CTG GAA TAC CAG TGG GTT AAC AAC ATC GGC GAC GCG GGC ACT GTG GGT ACC  
192  
Arg Pro Asp Asn Gly Met Leu Ser Leu Gly Val Ser Tyr Arg Phe Gly Gln Glu  
CGT CCT GAT AAC GGC ATG CTG AGC CTG GGC GTT TCC TAC CCG TTC GGT CAG GAA  
210  
Asp Ala Ala Pro Val Val Ala Pro Ala Pro Ala Pro Ala Pro Glu Val Ala Thr  
GAT GCT GCA CCG GTT GTT GCT CCG GCT CCG GCT CCG GCT CCG GAA GTG GCT ACC  
228  
Lys His Phe Thr Leu Lys Ser Asp Val Leu Phe Asn Phe Asn Lys Ala Thr Leu  
AAG CAC TTC ACC CTG AAG TCT GAC GTT CTG TTC AAC TTC AAC AAA GCT ACC CTG  
246  
Lys Pro Glu Gly Gln Gln Ala Leu Asp Gln Leu Tyr Thr Gln Leu Ser Asn Met  
AAA CCG GAA GGT CAG CAG GCT CTG GAT CAG CTG TAC ACT CAG CTG AGC AAC ATG  
264  
Asp Pro Lys Asp Gly Ser Ala Val Val Leu Gly Tyr Thr Asp Arg Ile Gly Ser  
GAT CCG AAA GAC GGT TCC GCT GTT GTT CTG GGC TAC ACC GAC CCG ATC GGT TCC

PCT/PTO 00049892

Glu Ala Tyr Asn Gln Gln Leu Ser Glu Lys Arg Ala Gln Ser Val Val Asp Tyr 282  
 GAA GCT TAC AAC CAG CAG CTG TCT GAG AAA CGT GCT CAG TCC GTC GTT GAC TAC  
 Leu Val Ala Lys Gly Ile Pro Ala Gly Lys Ile Ser Ala Arg Gly Met Gly Glu 300  
 CTG GTT GCT AAA GGC ATC CCG GCT GGC AAA ATC TCC GCT CGC GGC ATG GGT GAA  
 Ser Asn Pro Val Thr Gly Asn Thr Cys Asp Asn Val Lys Ala Arg Ala Ala Leu 318  
 TCC AAC CCG GTT ACT GGC AAC ACC TGT GAC AAC GTG AAA GCT CGC GCT GCC CTG  
 Ile Asp Cys Leu Ala Pro Asp Arg Arg Val Glu Ile Glu Val Lys Gly Tyr Lys 336  
 ATC GAT TGC CTG GCT CCG GAT CGT CGT GTA GAG ATC GAA GTT AAA GGC TAC AAA  
 344  
 Glu Val Val Thr Gln Pro Gln Ala  
 GAA GTT GTA ACT CAG CCT CAG GCT

Information for SEQ ID NO: 2 G2A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 101 amino acids, 303 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

130  
 N - Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys  
 5'- ACC GTG AAA ACC AAA AAC ACC AGC ACC ACC CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA  
 150  
 Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe  
 CAG CGT CAG AAC AAA CCG CCG AAC AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC  
 171 173 176 182 186  
 Val Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn  
 GTG CCG TGC AGC ATC TGC AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG AAC  
 192  
 Lys Lys Pro Gly Lys Lys Thr Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys Thr Thr Lys  
 AAA AAA CCG GGC AAA AAA ACC ACC ACC AAA CCG ACC AAA AAA CCG ACC TTC AAA ACC ACC AAA  
 213 230  
 Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val Pro Thr Thr Lys Pro - C  
 AAA GAT CAT AAA CCG CAG ACC ACC AAA CCG AAA GAA GTG CCG ACC ACC AAA CCG - 3'

Information for SEQ ID NO: 3 G2B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 101 amino acids, 303 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

Publ. No. 99/00703

130  
 N - Thr Ala Gln Thr Lys Gly Arg Ile Thr Thr Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys  
 5'- ACC GCG CAG ACC AAA GGC CGT ATC ACC ACC AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA  
 150  
 Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe  
 AGC CGT ACC AAA AAC CCG CCG AAA AAA CCG AAA GAT GAT TAC CAC TTC GAA GIG TTC AAC TTC

171 173 176 182 186  
 Val Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser  
 GIG CCC TGC AGC ATC TGC GGC AAC AAC CAG CTG TGC AAA AGC ATC TGC AAA ACC ATC CCG AGC  
 192  
 Asn Lys Pro Lys Lys Lys Pro Thr Ile Lys Pro Thr Asn Lys Pro Thr Thr Lys Thr Thr Asn  
 AAC AAA CCG AAA AAG AAA CCG ACC ATC AAA CCG ACC AAC AAA CCG ACC ACC AAA ACC ACC AAC  
 213  
 Lys Arg Asp Pro Lys Thr Pro Ala Lys Met Pro Lys Lys Glu Ile Ile Thr Asn - C  
 AAA CGT GAT CCG AAA ACC CCG GCG AAA ATG CCG AAG AAG GAA ATC ATC ACC AAC - 3'

Information for SEQ ID NO: 4 G2AδCys

SEQUENCE TYPE: amino acids and nucleotides  
 SEQUENCE LENGTH: 101 amino acids, 303 nucleotides  
 STRANDEDNESS: single  
 TOPOLOGY: linear  
 MOLECULE TYPE: protein

130  
 N - Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys  
 5'- ACC GIG AAA ACC AAA AAC ACC AGC ACC ACC CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA  
 150  
 Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe  
 CAG CGT CAG AAC AAA CCG CCG AAC AAA CCG AAC GAT TTC CAT TTC GAA GIG TTC AAC TTC  
 171 173 176 182 186  
 Val Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn  
 GTG CCG ACC AGC ATC TGC AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AAA CGT ATC CCG AAC  
 192  
 Lys Lys Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys Thr Thr Lys  
 AAA AAA CCG GGC AAA AAA ACC AGC ACC AAA CCG ACC AAA AAA CCG ACC TTC AAA ACC ACC AAA  
 213  
 Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val Pro Thr Thr Lys Pro - C  
 AAA GAT CAT AAA CCG CAG ACC ACC AAA CCG AAA GAA GIG CCG ACC ACC AAA CCG - 3'

Information for SEQ ID NO: 5 G2BδCys

SEQUENCE TYPE: amino acids and nucleotides  
 SEQUENCE LENGTH: 101 amino acids, 303 nucleotides  
 STRANDEDNESS: single  
 TOPOLOGY: linear  
 MOLECULE TYPE: protein

N - Thr Ala Gln Thr Lys Gly Arg Ile Thr Thr Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys  
5'- ACC GCG CAG ACC AAA GGC CGT ATC ACC ACC AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA  
150  
Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe  
AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC  
171 173 176 182 186  
Val Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser  
GTG CCG AGC AGC ATC TGC GGC AAC AAC CAG CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG AGC  
192  
Asn Lys Pro Lys Lys Lys Pro Thr Ile Lys Pro Thr Asn Lys Pro Thr Thr Lys Thr Thr Asn  
AAC AAA CCG AAA AAG AAA CCG ACC ATC AAA CCG ACC AAC AAA CCG ACC ACC AAA ACC ACC AAC  
213  
Lys Arg Asp Pro Lys Thr Pro Ala Lys Met Pro Lys Lys Glu Ile Ile Thr Asn - C  
AAA CGT GAT CCG AAA ACC CCG GCG AAA ATG CCG AAG AAG GAA ATC ATC ACC AAC - 3'  
230

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 14 amino acids, 42 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: peptide

N - Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys - C  
S' - AGC ATC TGC AGC AAC AAC GCG ACC TGC TGG GCG ATC TGC AAA - 3'

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 14 amino acids, 42 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: peptide

N - Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys - C  
5'- AGC ATC TGC GGC AAC AAC CAG CTG TGC AAA AGC ATC TGC AAA - 3'

```
SEQUENCE TYPE: amino acids and nucleotides
SEQUENCE LENGTH: 14 amino acids, 42 nucleotides
STRANDEDNESS: single
TOPOLOGY: linear
MOLECULE TYPE: peptide
```

[illegible]

174 176 182 186 187  
N - Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys - C  
5'- AGC ATC TGC AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AAA - 3'

Information for SEQ ID NO: 9 G1B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 14 amino acids, 42 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys - C  
5'- AGC ATC TGC GGC AAC AAC CAG CTG TGC AAA AGC ATC AGC AAA - 3'

Information for SEQ ID NO: 10 G1'A

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 14 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Ile Asp Ser Asn Asn Pro Thr Orn Trp Ala Ile Cys Lys - C

Information for SEQ ID NO: 11 G1'B

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 14 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Ile Asp Gly Asn Asn Gln Leu Orn Lys Ser Ile Cys Lys - C

Information for SEQ ID NO: 12 G1'A&C

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 14 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

Publ. No. 96/004366

174 176 182 186 187  
N - Ser Ile Asp Ser Asn Asn Pro Thr Orn Trp Ala Ile Ser Lys - C

Information for SEQ ID NO: 13 G1'B8C

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 14 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Ile Asp Gly Asn Asn Gln Leu Orn Lys Ser Ile Ser Lys - C

Information for SEQ ID NO: 14 G2A8CF

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 101 amino acids, 303 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

130  
N - Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys  
5' - ACC GTG AAA ACC AAA AAC ACC ACG ACC ACC CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA

150 163 165 168 170  
Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn Asp Ser His Ser Glu Val Ser Asn Ser  
CAG CGT CAG AAC AAA CCG CCG AAC AAA CCG AAC AAC GAT TCC CAT TCC GAA GTG TCC AAC TCC  
171 173 176 182 186  
Val Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn  
GTG CCG AGC ACG ATC TGC AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AWA CGT ATC CCG AAC  
192

Lys Lys Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys Thr Thr Lys  
AAA AAA CCG GGC AAA AAA ACC ACG ACC AAA CCG ACC AAA AAA CCG ACC TTC AAA ACC ACC AAA  
213

Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val Pro Thr Thr Lys Pro - C  
AAA GAT CAT AAA CCG CAG ACC ACC AAA CCG AAA GAA GTG CCG ACC ACC AAA CCG - 3'

Information for SEQ ID NO: 15 G4A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 17 amino acids, 51 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

171 173 176 182 186 187  
N - Val Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys - C  
5' - GTG CCG TGC AGC ATC TGC AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA - 3'

094330-6624960

Information for SEQ ID NO: 16 G4A8C

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 17 amino acids, 51 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: peptide

171	173	176	182	186	187												
N - Val	Pro	Ser	Ser	Ile	Cys	Ser	Asn	Asn	Pro	Thr	Cys	Trp	Ala	Ile	Ser	Lys	- C
5' - GTG	CCG	AGC	AGC	ATC	TGC	AGC	AAC	AAC	CCG	ACC	TGC	TGG	GGG	ATC	AGC	AAA	- 3'

Information for SEQ ID NO: 17 G4B

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 17 amino acids, 51 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: peptide

171	173	176	182	186	187												
N - Val	Pro	Cys	Ser	Ile	Cys	Gly	Asn	Asn	Gln	Leu	Cys	Lys	Ser	Ile	Cys	Lys	- C
5' -GTG	CCC	TGC	AGC	ATC	TGC	GGC	AAC	AAC	CAG	CTG	TGC	AAA	AGC	ATC	TGC	AAA	- 3'

Information for SEQ ID NO: 18 G4B8C

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 17 amino acids, 51 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: peptide

171	173	176	182	186	187												
N - Val	Pro	Ser	Ser	Ile	Cys	Gly	Asn	Asn	Gln	Leu	Cys	Lys	Ser	Ile	Ser	Lys	- C
5' -GTG	CCC	AGC	AGC	ATC	TGC	GGC	AAC	AAC	CAG	CTG	TGC	AAA	AGC	ATC	AGC	AAA	- 3'

Information for SEQ ID NO: 19 G4'A

SEQUENCE TYPE: amino acids  
SEQUENCE LENGTH: 17 amino acids  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: peptide

171	173	176	182	186	187												
N - Val	Pro	Asp	Ser	Ile	Asp	Ser	Asn	Asn	Pro	Thr	Orn	Trp	Ala	Ile	Orn	Lys	- C

Publ. No. WO 99/49892

Information for SEQ ID NO: 20 G4'AδC

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 17 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

171 173 176 182 186 187  
N - Val Pro Ser Ser Ile Asp Ser Asn Asn Pro Thr Orn Trp Ala Ile Ser Lys - C

Information for SEQ ID NO: 21 G4'B

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 17 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

171 173 176 182 186 187  
N - Val Pro Asp Ser Ile Asp Gly Asn Asn Gln Leu Orn Lys Ser Ile Orn Lys - C

Information for SEQ ID NO: 22 G4'BδC

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 17 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

171 173 176 182 186 187  
N - Val Pro Ser Ser Ile Asp Gly Asn Asn Gln Leu Orn Lys Ser Ile Ser Lys - C

Information for SEQ ID NO: 23 G200A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 61 amino acids, 183 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn  
 5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC  
 158 173 176  
 Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys  
 AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC  
 177 182 186  
 Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys Lys Pro Gly  
 AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG AAC AAA AAA CCG GGC  
 196 200  
 Lys Lys Thr Thr Thr - C  
 AAA AAA ACC ACG ACC - 3'

Information for SEQ ID NO: 24 G198A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 59 amino acids, 177 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn  
 5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC  
 158 173 176  
 Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys  
 AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC  
 177 182 186  
 Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys Lys Pro Gly  
 AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG AAC AAA AAA CCG GGC  
 196 198  
 Lys Lys Thr - C  
 AAA AAA ACC - 3'

Information for SEQ ID NO: 25 G196A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 57 amino acids, 171 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn  
 5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC  
 158 173 176  
 Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys  
 AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC  
 177 182 186  
 Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys Lys Pro Gly  
 AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG AAC AAA AAA CCG GGC  
 196  
 Lys - C  
 AAA - 3'

Information for SEQ ID NO: 26 G194A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 55 amino acids, 165 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn
5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC
158                                     173                                     176
Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys
AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC
177                                     182                                     186                                     194
Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys Lys Pro - C
AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG AAC AAA AAA CCG - 3'

```

Information for SEQ ID NO: 27 G192A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 52 amino acids, 159 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn
5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC
158                                     173                                     176
Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys
AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC
177                                     182                                     186                                     192
Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys - C
AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG AAC AAA - 3'

```

Information for SEQ ID NO: 28 G6A

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 51 amino acids, 153 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn
5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC
158                                     173                                     176
Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys
AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC

```

177                      182                      186                      190  
Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro - C  
AGC AAC AAC CCG ACC TGC TGG GCG ATC TGC AAA CGT ATC CCG - 3'

Information for SEO ID NO: 29                      G7A

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 33 amino acids, 99 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: protein

158															173			
N -	Lys	Pro	Asn	Asn	Asp	Phe	His	Phe	Glu	Val	Phe	Asn	Phe	Val	Pro	Cys	Ser	Ile
5'-	AAA	CCG	AAC	AAC	GAT	TTC	CAT	TTC	GAA	GTC	TTC	AAC	TTC	GTC	CCG	TGC	AGC	ATC
176															182	186	190	
Cys	Ser	Asn	Asn	Pro	Thr	Cys	Trp	Ala	Ile	Cys	Lys	Arg	Ile	Pro	-	C		
TGC	AGC	AAC	AAC	CCG	ACC	TGC	TGG	GGG	ATC	TGC	AAA	CGT	ATC	CCG	-	3'		

Information for SEQ ID NO: 30 G200A8C

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 61 amino acids, 183 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: protein

140  
N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn  
5' - CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC  
158  
Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys  
AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG AGC AGC ATC TGC  
177  
Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn Lys Lys Pro Gly  
AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AAA CGT ATC CCG AAC AAA AAA CCG GGC  
196  
Lys Lys Thr Thr - C  
AAA AAA ACC ACC ACC - 3'

Information for SEQ ID NO: 31 G198A8C

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 59 amino acids, 177 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: protein

[illegible]

Information for SEO ID NO: 32      G196A8C

MOLECULE TYPE: protein

Information for SEQ ID NO: 33 G194A8C

MOLECULE TYPE: protein

140

N -	Gln	Thr	Gln	Pro	Ser	Lys	Pro	Thr	Thr	Lys	Gln	Arg	Gln	Asn	Lys	Pro	Pro	Asn
5' -	CAG	ACC	CAG	CCG	AGC	AAA	CCG	ACC	ACC	AAA	CAG	CGT	CAG	AAC	AAA	CCG	CCG	AAC

158

Lys	Pro	Asn	Asn	Asp	Phe	His	Phe	Glu	Val	Phe	Asn	Phe	Val	Pro	Ser	Ser	Ile	Cys
AAA	CCG	AAC	AAC	GAT	TTC	CAT	TTC	GAA	GTG	TTC	AAC	TTC	GTG	CCG	AGC	AGC	ATC	TGC

177

					182				186								194	
Ser	Asn	Asn	Pro	Thr	Cys	Trp	Ala	Ile	Ser	Lys	Arg	Ile	Pro	Asn	Lys	Lys	Pro	- C
AGC	AAC	AAC	CCG	ACC	TGC	TGG	GCG	ATC	AGC	AAA	CGT	ATC	CCG	AAC	AAA	AAA	CCG	- 3'

Information for SEQ ID NO: 34 G192A8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 53 amino acids, 159 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

140
N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn
5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC
158                                     173
Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys
AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG AGC AGC ATC TGC
177                                     182
Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn Lys - C
AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AAA CGT ATC CCG AAC AAA - 3'

```

Information for SEQ ID NO: 35 G6A8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 51 amino acids, 153 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

140
N - Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn
5'- CAG ACC CAG CCG AGC AAA CCG ACC ACC AAA CAG CGT CAG AAC AAA CCG CCG AAC
158                                     173
Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys
AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG AGC AGC ATC TGC
177                                     182
Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro - C
AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AAA CGT ATC CCG - 3'

```

Information for SEQ ID NO: 36 G7A8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 33 amino acids, 99 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

158                                     173
N - Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile
5'- AAA CCG AAC AAC GAT TTC CAT TTC GAA GTG TTC AAC TTC GTG CCG AGC AGC ATC
176                                     182
Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro - C
TGC AGC AAC AAC CCG ACC TGC TGG GCG ATC AGC AAA CGT ATC CCG - 3'

```

Information for SEQ ID NO: 37 G200B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 61 amino acids, 183 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
 5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG  
 160 173 176  
 Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly Asn Asn Gln  
 AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC GGC AAC AAC CAG  
 182 186 200  
 Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro Thr Ile- C  
 CTG TGC AAA AGC ATC TGC AAA ACC ATC CCG AGC AAC AAA CCG AAA AAG AAA CCG ACC ATC- 3'

Information for SEQ ID NO: 38 G198B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 59 amino acids, 177 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
 5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG  
 160 173 176  
 Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly Asn Asn Gln  
 AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC GGC AAC AAC CAG  
 182 186 198  
 Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro - C  
 CTG TGC AAA AGC ATC TGC AAA ACC ATC CCG AGC AAC AAA CCG AAA AAG AAA CCG - 3'

Information for SEQ ID NO: 39 G196B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 57 amino acids, 171 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

Sequence = G200B

Information for SEO ID NO: 40                      G194B

140  
N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
5' - AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG

160  
Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly Asn Asn Gln  
AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCG TCC AGC ATC TCC GCC AAC AAC CAG

182 186 194  
Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser Asn Lys Pro - C  
CTG TGC AAA AGC ATC TCC AAA ACC ATC CCG AGC AAC AAA CCG - 3'

Information for SEQ ID NO: 41                      G192B

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 53 amino acids, 159 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: protein

140  
N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG  
160 173 176  
Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly Asn Asn Gln  
AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCG TGC AGC ATC TGC GGC AAC AAC CAG  
182 186 192  
Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser Asn - C  
CTG TGC AAA AGC ATC TGC AAA ACC ATC CCG AGC AAC - 3'

Information for SEQ ID NO: 42 G6B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 51 amino acids, 153 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro
5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG
160                                     173       176
Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly Asn Asn Gln
AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCC TGC AGC ATC TGC GGC AAC AAC CAG
182       186       190
Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro - C
CTG TGC AAA AGC ATC TGC AAA ACC ATC CCG - 3'

```

Information for SEQ ID NO: 43 G7B

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 33 amino acids, 99 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      158                                     173       176
N - Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly
5'- AAA CCG AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCC TGC AGC ATC TGC GGC

      182       186       190
Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro - C
AAC AAC CAG CTG TGC AAA AGC ATC TGC AAA ACC ATC CCG - 3'

```

Information for SEQ ID NO: 44 G200BdC

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 61 amino acids, 183 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro
5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG
160                                     173       176
Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly Asn Asn Gln
AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCC ACC AGC ATC TGC GGC AAC AAC CAG
182       186                                     200
Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro Thr Ile- C
CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG AGC AAC AAA CCG AAA AAG AAA CCG ACC ATC- 3'

```

Information for SEQ ID NO: 45                      G198B8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 59 amino acids, 177 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro
5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG
      160                               173           176
Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly Asn Asn Gln
AAA GAT GAT TAC CAC TTC GAA GIG TTC AAC TTC GIG CCG AGC AGC ATC TGC GGC AAC AAC CAG
      182                               186                               198
Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro - C
CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG AGC AAC AAA CCG AAA AAC AAA CCG - 3'

```

Information for SEQ ID NO: 46                      G196B8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 57 amino acids, 171 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      140
N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro
5'- AGC ACC CAG ACC AAC AAA CCG AGC ACC AAA AGC CGT AGC AAA AAC CCG CCG AAA AAA CCG
      160                               173           176
Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly Asn Asn Gln
AAA GAT GAT TAC CAC TTC GAA GIG TTC AAC TTC GIG CCG AGC AGC ATC TGC GGC AAC AAC CAG

      182                               186                               196
Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn Lys Pro Lys Lys - C
CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG AGC AAC AAA CCG AAA AAC - 3'

```

Information for SEQ ID NO: 47                      G194B8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 55 amino acids, 165 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
 5'- AGC ACC CAG ACC APC AAA CCG AGC ACC AAA AGC CGT AGC AAA APC CCG CCG AAA AAA CCG  
 160 173 176  
 Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly Asn Asn Gln  
 AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCC AGC AGC ATC TGC GGC AAC APC CAG  
 182 186 194  
 Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn Lys Pro - C  
 CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG AGC APC AAA CCG - 3'

Information for SEQ ID NO: 48 G192B8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 53 amino acids, 159 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
 5'- AGC ACC CAG ACC APC AAA CCG AGC ACC AAA AGC CGT AGC AAA APC CCG CCG AAA AAA CCG  
 160 173 176  
 Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly Asn Asn Gln  
 AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCC AGC AGC ATC TGC GGC AAC APC CAG  
 182 186 192  
 Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn - C  
 CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG AGC APC - 3'

Information for SEQ ID NO: 49 G6B8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 51 amino acids, 153 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro  
 5'- AGC ACC CAG ACC APC AAA CCG AGC ACC AAA AGC CGT AGC AAA APC CCG CCG AAA AAA CCG  
 160 173 176  
 Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly Asn Asn Gln  
 AAA GAT GAT TAC CAC TTC GAA GTG TTC AAC TTC GTG CCC AGC AGC ATC TGC GGC AAC APC CAG

182 186 190  
 Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro - C  
 CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG - 3'

00647309-00624900

Information for SEQ ID NO: 50 G7BδC

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 33 amino acids, 99 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      158                               173       176
N - Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly
5'- AAA CCG AAA GAT GAT TAC CAC TTC GAA GIG TTC AAC TTC GIG CCC AGC AGC ATC TGC GGC
      182       186       190
Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro - C
AAC AAC CAG CTG TGC AAA AGC ATC AGC AAA ACC ATC CCG - 3'

```

Information for SEQ ID NO: 51 G2V

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 101 amino acids, 303 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      130
N - Gln Asn Arg Lys Ile Lys Gly Gln Ser Thr Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn
5'- CAA AAC AGA AAA ATC AAA GGT CAA TCA ACA CTA CCA GGC ACA AGA AAA CCA CCA ATT AAT
      150
Pro Ser Gly Ser Ile Pro Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr
CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT
      171       173       176       182       186
Val Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His Ile Glu Thr Glu
GTT CCC TGC AGT ACA TGT GAA GGT AAT CTT GCA TGC TTA TCA CTC TGC CAT ATT GAG ACG GAA
      192
Arg Ala Pro Ser Arg Ala Pro Thr Ile Thr Leu Lys Lys Thr Pro Lys Pro Lys Thr Thr Lys
AGA GCA CCA AGC AGA GCA CCA ACA ATC ACC CTC AAA AAG ACA CCA AAA CCA AAA ACC ACA AAA
      213                               230
Lys Pro Thr Lys Thr Thr Ile His His Arg Thr Ser Pro Glu Thr Lys Leu Gln - C
AAG CCA ACC AAG ACA ACA ATC CAT CAC AGA ACC AGC CCA GAA ACC AAA CTG CAA - 3'

```

Information for SEQ ID NO: 52 G2VδC

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 101 amino acids, 303 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

```

      130
N - Gln Asn Arg Lys Ile Lys Gly Gln Ser Thr Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn
5'- CAA AAC AGA AAA ATC AAA GGT CAA TCA ACA CTA CCA GGC ACA AGA AAA CCA CCA ATT AAT

```

150

Pro Ser Gly Ser Ile Pro Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr  
 OCA TCA GGA AGC ATC OCA OCA GAA AAC CAT CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT  
 171 173 176 182 186  
 Val Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu  
 GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG GAA  
 192  
 Arg Ala Pro Ser Arg Ala Pro Thr Ile Thr Leu Lys Lys Thr Pro Lys Pro Lys Thr Thr Lys  
 AGA GCA OCA AGC AGA GCA OCA ACA ATC ACC CTC AAA AAG ACA OCA AAA OCA AAA ACC ACA AAA  
 213 230  
 Lys Pro Thr Lys Thr Thr Ile His His Arg Thr Ser Pro Glu Thr Lys Leu Gln - C  
 AAG OCA ACC AAG ACA ACA ATC CAT CAC AGA ACC AGC OCA GAA ACC AAA CTG CAA - 3'

Information for SEQ ID NO: 53 G200V

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 61 amino acids, 183 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140

N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA OCA GCC ACA AGA AAA OCA OCA ATT AAT OCA TCA GGA AGC ATC OCA OCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC TGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 200  
 Ala Cys Leu Ser Leu Cys His Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro Thr Ile - C  
 GCA TGC TTA TCA CTC TGC CAT ATT GAG ACG GAA AGA GCA OCA AGC AGA GCA OCA ACA ATC - 3'

Information for SEQ ID NO: 54 G198V

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 59 amino acids, 177 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140

N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA OCA GCC ACA AGA AAA OCA OCA ATT AAT OCA TCA GGA AGC ATC OCA OCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC TGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 198  
 Ala Cys Leu Ser Leu Cys His Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro - C  
 GCA TGC TTA TCA CTC TGC CAT ATT GAG ACG GAA AGA GCA OCA AGC AGA GCA OCA - 3'

PCT/FR99/00703

SEQUENCE TYPE: amino acids and nucleotides  
SEQUENCE LENGTH: 53 amino acids, 159 nucleotides  
STRANDEDNESS: single  
TOPOLOGY: linear  
MOLECULE TYPE: protein

140  
 N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA CCA GCC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC TGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 192  
 Ala Cys Leu Ser Leu Cys His Ile Glu Thr Glu Arg - C  
 GCA TGC TTA TCA CTC TGC CAT ATT GAG ACG GAA ACA - 3'

Information for SEQ ID NO: 58 G6V

SEQUENCE LENGTH: 51 amino acids, 153 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA CCA GCC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC TGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 190  
 Ala Cys Leu Ser Leu Cys His Ile Glu Thr - C  
 GCA TGC TTA TCA CTC TGC CAT ATT GAG ACG - 3'

Information for SEQ ID NO: 59 G7V

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 33 amino acids, 99 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

158 173 176  
 N - Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys  
 5'- AAC CAT CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC TGC AGT ACA TGT  
 182 186 190  
 Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His Ile Glu Thr - C  
 GAA GGT AAT CTT GCA TGC TTA TCA CTC TGC CAT ATT GAG ACG - 3'

Information for SEQ ID NO: 60 G200V8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 61 amino acids, 183 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

Publ. No. WO 99/49892

140  
 N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA CCA GCC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 200  
 Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro Thr Ile - C  
 GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG GAA AGA GCA CCA AGC AGA GCA CCA ACA ATC - 3'

Information for SEQ ID NO: 61 G198VδC

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 59 amino acids, 177 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA CCA GCC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 198  
 Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro - C  
 GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG GAA AGA GCA CCA AGC AGA GCA CCA - 3'

Information for SEQ ID NO: 62 G196VδC

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 57 amino acids, 171 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
 N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
 5'- CTA CCA GCC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
 160 173 176  
 Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu Gly Asn Leu  
 CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT  
 182 186 196  
 Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg Ala Pro Ser Arg - C  
 GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG GAA AGA GCA CCA AGC AGA - 3'

Information for SEQ ID NO: 63 G194VδC

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 55 amino acids, 165 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
5'- CTA CCA GGC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
160 173 176  
Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu Gly Asn Leu  
CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT  
182 186 194  
Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg Ala Pro - C  
GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG GAA AGA GCA CCA - 3'

Information for SEQ ID NO: 64 G192V8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 53 amino acids, 159 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
5'- CTA CCA GGC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
160 173 176  
Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu Gly Asn Leu  
CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT  
182 186 192  
Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg - C  
GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG GAA AGA - 3'

Information for SEQ ID NO: 65 G6V8C

SEQUENCE LENGTH: 51 amino acids, 153 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: protein

140  
N - Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His  
5'- CTA CCA GGC ACA AGA AAA CCA CCA ATT AAT CCA TCA GGA AGC ATC CCA CCA GAA AAC CAT  
160 173 176  
Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu Gly Asn Leu  
CAA GAC CAC AAC AAC TTC CAA ACA CTC CCC TAT GTT CCC AGC AGT ACA TGT GAA GGT AAT CTT  
182 186 190  
Ala Cys Leu Ser Leu Ser His Ile Glu Thr - C  
GCA TGC TTA TCA CTC AGC CAT ATT GAG ACG - 3'

Information for SEQ ID NO: 66 G7V8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 33 amino acids, 99 nucleotides

Publ. No. WO 99/49892

MOLECULE TYPE: protein

Information for SEQ ID NO: 67 G4V

MOLECULE TYPE: peptide

Information for SEQ ID NO: 68 G4V8C

MOLECULE TYPE: peptide

Information for SEQ ID NO: 69 G4'V

MOLECULE TYPE: peptide

Information for SEQ ID NO: 70 G4'V8C

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 17 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

171 173 176 182 186 187  
N - Val Pro Ser Ser Thr Asp Glu Gly Asn Leu Ala Orn Leu Ser Leu Ser His - C

Information for SEQ ID NO: 71 G1V

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 14 amino acids, 42 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His - C  
5' - AGT ACA TGT GAA GGT AAT CTT GCA TGC TTA TCA CTC TGC CAT - 3'

Information for SEQ ID NO: 72 G1V8C

SEQUENCE TYPE: amino acids and nucleotides

SEQUENCE LENGTH: 14 amino acids, 42 nucleotides

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His - C  
5' - AGT ACA TGT GAA GGT AAT CTT GCA TGC TTA TCA CTC AGC CAT - 3'

Information for SEQ ID NO: 73 G1'V8C

SEQUENCE TYPE: amino acids

SEQUENCE LENGTH: 14 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Thr Asp Glu Gly Asn Leu Ala Orn Leu Ser Leu Ser His - C

Information for SEQ ID NO: 74 G1'

SEQUENCE TYPE: amino acids

Publ. No. 99/00703

WO 99/49892

- 27 -

PCT/FR99/00703

SEQUENCE LENGTH: 15 amino acids

STRANDEDNESS: single

TOPOLOGY: linear

MOLECULE TYPE: peptide

174 176 182 186 187  
N - Ser Ile Asp Ser Asn Asn Pro Thr Orn Trp Ala Ile Ser Lys Cys - C

WO 99/49892

SEQUENCE LISTING

<110> Pierre Fabre Médicament

<120> USE OF ACTIVE P40 CONJUGATES FOR NASAL DELIVERY

<130> D17064

<140> PCT/FR99/00703

<141> 1999-03-26

<150> FR 98 03814

<151> 1998-03-27

<160> 136

<170> PatentIn Vers. 2.0

<210> 1

<211> 1032

<212> ADN

<213> Klebsiella pneumoniae

<220>

<221> CDS

<222> (1)..(1032)

<223> rP40

<400> 1

atg	aaa	gca	att	ttc	gta	ctg	aat	gcg	gct	ccg	aaa	gat	aac	acc	tgg	48
Met	Lys	Ala	Ile	Phe	Val	Leu	Asn	Ala	Ala	Pro	Lys	Asp	Asn	Thr	Trp	
1				5				10						15		

tat	gca	ggg	ggg	aaa	ctg	ggg	tgg	tcc	cag	tat	cac	gac	acc	ggg	ttc	96
Tyr	Ala	Gly	Gly	Lys	Leu	Gly	Trp	Ser	Gln	Tyr	His	Asp	Thr	Gly	Phe	
		20						25					30			

tac	ggg	aac	ggg	ttc	cag	aac	aac	aac	ggg	ccg	acc	cgt	aac	gat	cag	144
Tyr	Gly	Asn	Gly	Phe	Gln	Asn	Asn	Asn	Gly	Pro	Thr	Arg	Asn	Asp	Gln	
		35					40					45				

ctt	ggg	gct	ggg	gca	ttc	ggg	ggg	tac	cag	gtt	aac	ccg	tac	ctc	ggg	192
Leu	Gly	Ala	Gly	Ala	Phe	Gly	Gly	Tyr	Gln	Val	Asn	Pro	Tyr	Leu	Gly	
		50				55					60					

ttc	gaa	atg	ggg	tat	gac	tgg	ctg	ggc	cgt	atg	gca	tat	aaa	ggc	agc	240
Phe	Glu	Met	Gly	Tyr	Asp	Trp	Leu	Gly	Arg	Met	Ala	Tyr	Lys	Gly	Ser	
	65				70				75					80		

gtt	gac	aac	ggg	gct	ttc	aaa	gct	cag	ggc	gtt	cag	ctg	acc	gct	aaa	288
Val	Asp	Asn	Gly	Ala	Phe	Lys	Ala	Gln	Gly	Val	Gln	Leu	Thr	Ala	Lys	
			85					90						95		

ctg	ggg	tac	ccg	atc	act	gac	gat	ctg	gac	atc	tac	acc	cgt	ctg	ggc	336
Leu	Gly	Tyr	Pro	Ile	Thr	Asp	Asp	Leu	Asp	Ile	Tyr	Thr	Arg	Leu	Gly	
			100					105					110			

ggc	atg	gtt	tgg	cgc	gct	gac	tcc	aaa	ggc	aac	tac	gct	tct	acc	ggc	384
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Gly	Met	Val	Trp	Arg	Ala	Asp	Ser	Lys	Gly	Asn	Tyr	Ala	Ser	Thr	Gly	
		115					120					125				
gtt	tcc	cgt	agc	gaa	cac	gac	act	ggc	gtt	tcc	cca	gta	ttt	gct	ggc	432
Val	Ser	Arg	Ser	Glu	His	Asp	Thr	Gly	Val	Ser	Pro	Val	Phe	Ala	Gly	
	130					135					140					
ggc	gta	gag	tggt	gct	gtt	act	cgt	gac	atc	gct	acc	cgt	ctg	gaa	tac	480
Gly	Val	Glu	Trp	Ala	Val	Thr	Arg	Asp	Ile	Ala	Thr	Arg	Leu	Glu	Tyr	
145					150					155				160		
cag	tggt	gtt	aac	aac	atc	ggc	gac	gag	ggc	act	gtg	ggt	acc	cgt	cct	528
Gln	Trp	Val	Asn	Asn	Ile	Gly	Asp	Ala	Gly	Thr	Val	Gly	Thr	Arg	Pro	
			165						170				175			
gat	aac	ggc	atg	ctg	agc	ctg	ggc	gtt	tcc	tac	cgc	ttc	ggt	cag	gaa	576
Asp	Asn	Gly	Met	Leu	Ser	Leu	Gly	Val	Ser	Tyr	Arg	Phe	Gly	Gln	Glu	
			180					185					190			
gat	gct	gca	ccg	gtt	gtt	gct	ccg	gct	ccg	gct	ccg	gct	ccg	gaa	gtg	624
Asp	Ala	Ala	Pro	Val	Val	Ala	Pro	Ala	Pro	Ala	Pro	Ala	Pro	Glu	Val	
		195					200					205				
gct	acc	aag	cac	ttc	acc	ctg	aag	tct	gac	gtt	ctg	ttc	aac	ttc	aac	672
Ala	Thr	Lys	His	Phe	Thr	Leu	Lys	Ser	Asp	Val	Leu	Phe	Asn	Phe	Asn	
	210					215					220					
aaa	gct	acc	ctg	aaa	ccg	gaa	ggc	cag	cag	gct	ctg	gat	cag	ctg	tac	720
Lys	Ala	Thr	Leu	Lys	Pro	Glu	Gly	Gln	Gln	Ala	Leu	Asp	Gln	Leu	Tyr	
225					230					235				240		
act	cag	ctg	agc	aac	atg	gat	ccg	aaa	gac	ggc	tcc	gct	gtt	gtt	ctg	768
Thr	Gln	Leu	Ser	Asn	Met	Asp	Pro	Lys	Asp	Gly	Ser	Ala	Val	Val	Leu	
			245						250				255			
ggc	tac	acc	gac	cgc	atc	ggc	tcc	gaa	gct	tac	aac	cag	cag	ctg	tct	816
Gly	Tyr	Thr	Asp	Arg	Ile	Gly	Ser	Glu	Ala	Tyr	Asn	Gln	Gln	Leu	Ser	
			260					265				270				
gag	aaa	cgt	gct	cag	tcc	gtc	gtt	gac	tac	ctg	gtt	gct	aaa	ggc	atc	864
Glu	Lys	Arg	Ala	Gln	Ser	Val	Val	Asp	Tyr	Leu	Val	Ala	Lys	Gly	Ile	
	275					280						285				
ccg	gct	ggc	aaa	atc	tcc	gct	cgc	ggc	atg	ggc	gaa	tcc	aac	ccg	gtt	912
Pro	Ala	Gly	Lys	Ile	Ser	Ala	Arg	Gly	Met	Gly	Glu	Ser	Asn	Pro	Val	
	290					295					300					
act	ggc	aac	acc	tgt	gac	aac	gtg	aaa	gct	cgc	gct	gcc	ctg	atc	gat	960
Thr	Gly	Asn	Thr	Cys	Asp	Asn	Val	Lys	Ala	Arg	Ala	Ala	Leu	Ile	Asp	
305					310				315					320		
tgc	ctg	gct	ccg	gat	cgt	cgt	gta	gag	atc	gaa	gtt	aaa	ggc	tac	aaa	1008
Cys	Leu	Ala	Pro	Asp	Arg	Arg	Val	Glu	Ile	Glu	Val	Lys	Gly	Tyr	Lys	
			325					330					335			
gaa	gtt	gta	act	cag	cct	cag	gct									1032
Glu	Val	Val	Thr	Gln	Pro	Gln	Ala									
			340													

<210> 2  
 <211> 344  
 <212> PRT  
 <213> *Klebsiella pneumoniae*

<400> 2  
 Met Lys Ala Ile Phe Val Leu Asn Ala Ala Pro Lys Asp Asn Thr Trp  
   1                  5                  10                  15  
 Tyr Ala Gly Gly Lys Leu Gly Trp Ser Gln Tyr His Asp Thr Gly Phe  
                   20                  25                  30  
 Tyr Gly Asn Gly Phe Gln Asn Asn Asn Gly Pro Thr Arg Asn Asp Gln  
           35                          40                  45  
 Leu Gly Ala Gly Ala Phe Gly Gly Tyr Gln Val Asn Pro Tyr Leu Gly  
   50                          55                  60  
 Phe Glu Met Gly Tyr Asp Trp Leu Gly Arg Met Ala Tyr Lys Gly Ser  
   65                  70                  75                  80  
 Val Asp Asn Gly Ala Phe Lys Ala Gln Gly Val Gln Leu Thr Ala Lys  
                   85                  90                  95  
 Leu Gly Tyr Pro Ile Thr Asp Asp Leu Asp Ile Tyr Thr Arg Leu Gly  
           100                  105                  110  
 Gly Met Val Trp Arg Ala Asp Ser Lys Gly Asn Tyr Ala Ser Thr Gly  
   115                  120                  125  
 Val Ser Arg Ser Glu His Asp Thr Gly Val Ser Pro Val Phe Ala Gly  
   130                  135                  140  
 Gly Val Glu Trp Ala Val Thr Arg Asp Ile Ala Thr Arg Leu Glu Tyr  
   145                  150                  155                  160  
 Gln Trp Val Asn Asn Ile Gly Asp Ala Gly Thr Val Gly Thr Arg Pro  
           165                  170                  175  
 Asp Asn Gly Met Leu Ser Leu Gly Val Ser Tyr Arg Phe Gly Gln Glu  
   180                  185                  190  
 Asp Ala Ala Pro Val Val Ala Pro Ala Pro Ala Pro Ala Pro Glu Val  
   195                  200                  205  
 Ala Thr Lys His Phe Thr Leu Lys Ser Asp Val Leu Phe Asn Phe Asn  
   210                  215                  220  
 Lys Ala Thr Leu Lys Pro Glu Gly Gln Gln Ala Leu Asp Gln Leu Tyr  
   225                  230                  235                  240  
 Thr Gln Leu Ser Asn Met Asp Pro Lys Asp Gly Ser Ala Val Val Leu  
           245                  250                  255  
 Gly Tyr Thr Asp Arg Ile Gly Ser Glu Ala Tyr Asn Gln Gln Leu Ser  
   260                  265                  270

Glu Lys Arg Ala Gln Ser Val Val Asp Tyr Leu Val Ala Lys Gly Ile  
 275 280 285

Pro Ala Gly Lys Ile Ser Ala Arg Gly Met Gly Glu Ser Asn Pro Val  
 290 295 300

Thr Gly Asn Thr Cys Asp Asn Val Lys Ala Arg Ala Ala Leu Ile Asp  
 305 310 315 320

Cys Leu Ala Pro Asp Arg Arg Val Glu Ile Glu Val Lys Gly Tyr Lys  
 325 330 335

Glu Val Val Thr Gln Pro Gln Ala  
 340

<210> 3  
 <211> 303  
 <212> ADN  
 <213> Respiratory Syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(303)

<220>  
 <223> G2A

<400> 3  
 acc gtg aaa acc aaa aac acc acg acc acc cag acc cag ccg agc aaa 48  
 Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys  
 1 5 10 15

ccg acc acc aaa cag cgt cag aac aaa ccg ccg aac aaa ccg aac aac 96  
 Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn  
 20 25 30

gat ttc cat ttc gaa gtg ttc aac ttc gtg ccg tgc agc atc tgc agc 144  
 Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Ser  
 35 40 45

aac aac ccg acc tgc tgg gcg atc tgc aaa cgt atc ccg aac aaa aaa 192  
 Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys Lys  
 50 55 60

ccg ggc aaa aaa acc acg acc aaa ccg acc aaa aaa ccg acc ttc aaa 240  
 Pro Gly Lys Lys Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys  
 65 70 75 80

acc acc aaa aaa gat cat aaa ccg cag acc acc aaa ccg aaa gaa gtg 288  
 Thr Thr Lys Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val  
 85 90 95

ccg acc acc aaa ccg 303  
 Pro Thr Thr Lys Pro  
 100

<210> 4  
 <211> 101  
 <212> PRT  
 <213> Respiratory Syncytial Virus (RSV)

<400> 4  
 Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys  
 1 5 10 15  
 Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn  
 20 25 30  
 Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Ser  
 35 40 45  
 Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile Pro Asn Lys Lys  
 50 55 60  
 Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys  
 65 70 75 80  
 Thr Thr Lys Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val  
 85 90 95  
 Pro Thr Thr Lys Pro  
 100

<210> 5  
 <211> 303  
 <212> ADN  
 <213> Respiratory Syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(303)

<220>  
 <223> G2B

<400> 5  
 acc gcg cag acc aaa ggc cgt atc acc acc agc acc cag acc aac aaa 48  
 Thr Ala Gln Thr Lys Gly Arg Ile Thr Thr Ser Thr Gln Thr Asn Lys  
 1 5 10 15  
 ccg agc acc aaa agc cgt agc aaa aac ccg ccg aaa aaa ccg aaa gat 96  
 Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro Lys Asp  
 20 25 30  
 gat tac cac ttc gaa gtg ttc aac ttc gtg ccc tgc agc atc tgc ggc 144  
 Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly  
 35 40 45  
 aac aac cag ctg tgc aaa agc atc tgc aaa acc atc ccg agc aac aaa 192  
 Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser Asn Lys  
 50 55 60

ccg aaa aag aaa ccg acc atc aaa ccg acc aac aaa ccg acc acc aaa 240  
Pro Lys Lys Lys Pro Thr Ile Lys Pro Thr Asn Lys Pro Thr Thr Lys  
65 70 75 80

acc acc aac aaa cgt gat ccg aaa acc ccg gcg aaa atg ccg aag aag 288  
Thr Thr Asn Lys Arg Asp Pro Lys Thr Pro Ala Lys Met Pro Lys Lys  
85 90 95

gaa atc atc acc aac 303  
Glu Ile Ile Thr Asn  
100

<210> 6

<211> 101

<212> PRT

<213> Respiratory Syncytial Virus (RSV)

<400> 6

Thr Ala Gln Thr Lys Gly Arg Ile Thr Thr Ser Thr Gln Thr Asn Lys  
1 5 10 15

Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro Lys Asp  
20 25 30

Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys Ser Ile Cys Gly  
35 40 45

Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys Thr Ile Pro Ser Asn Lys  
50 55 60

Pro Lys Lys Lys Pro Thr Ile Lys Pro Thr Asn Lys Pro Thr Thr Lys  
65 70 75 80

Thr Thr Asn Lys Arg Asp Pro Lys Thr Pro Ala Lys Met Pro Lys Lys  
85 90 95

Glu Ile Ile Thr Asn  
100

<210> 7

<211> 303

<212> ADN

<213> Respiratory Syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(303)

<220>

<223> G2AδCys

<400> 7

acc gtg aaa acc aaa aac acc acg acc acc cag acc cag ccg agc aaa 48  
Thr Val Lys Thr Lys Asn Thr Thr Thr Gln Thr Gln Pro Ser Lys  
1 5 10 15

ccg acc acc aaa cag cgt cag aac aaa ccg ccg aac aaa ccg aac aac 96  
Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn  
20 25 30

gat ttc cat ttc gaa gtg ttc aac ttc gtg ccg agc agc atc tgc agc 144  
Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Ser  
35 40 45

aac aac ccg acc tgc tgg gcg atc agc aaa cgt atc ccg aac aaa aaa 192  
Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn Lys Lys  
50 55 60

ccg ggc aaa aaa acc acg acc aaa ccg acc aaa aaa ccg acc ttc aaa 240  
Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys  
65 70 75 80

acc acc aaa aaa gat cat aaa ccg cag acc acc aaa ccg aaa gaa gtg 288  
Thr Thr Lys Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val  
85 90 95

ccg acc acc aaa ccg 303  
Pro Thr Thr Lys Pro  
100

<210> 8

<211> 101

<212> PRT

<213> Respiratory Syncytial Virus (RSV)

<400> 8

Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys  
1 5 10 15

Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn  
20 25 30

Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Ser  
35 40 45

Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn Lys Lys  
50 55 60

Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys  
65 70 75 80

Thr Thr Lys Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val  
85 90 95

Pro Thr Thr Lys Pro  
100

<210> 9

<211> 303

<212> ADN

<213> Respiratory Syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(303)

<220>  
<223> G2BδCys

<400> 9

```

acc gcg cag acc aaa ggc cgt atc acc acc agc acc cag acc aac aaa      48
Thr Ala Gln Thr Lys Gly Arg Ile Thr Thr Ser Thr Gln Thr Asn Lys
   1             5             10             15

ccg agc acc aaa agc cgt agc aaa aac ccg ccg aaa aaa ccg aaa gat      96
Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro Lys Asp
           20             25             30

gat tac cac ttc gaa gtg ttc aac ttc gtg ccc agc agc atc tgc ggc      144
Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly
           35             40             45

aac aac cag ctg tgc aaa agc atc agc aaa acc atc ccg agc aac aaa      192
Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn Lys
   50             55             60

ccg aaa aag aaa ccg acc atc aaa ccg acc aac aaa ccg acc acc aaa      240
Pro Lys Lys Lys Pro Thr Ile Lys Pro Thr Asn Lys Pro Thr Thr Lys
   65             70             75             80

acc acc aac aaa cgt gat ccg aaa acc ccg gcg aaa atg ccg aag aag      288
Thr Thr Asn Lys Arg Asp Pro Lys Thr Pro Ala Lys Met Pro Lys Lys
           85             90             95

gaa atc atc acc aac
Glu Ile Ile Thr Asn
           100

```

<210> 10  
<211> 101  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<400> 10

```

Thr Ala Gln Thr Lys Gly Arg Ile Thr Thr Ser Thr Gln Thr Asn Lys
   1             5             10             15

Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro Pro Lys Lys Pro Lys Asp
           20             25             30

Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser Ser Ile Cys Gly
           35             40             45

Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys Thr Ile Pro Ser Asn Lys
   50             55             60

Pro Lys Lys Lys Pro Thr Ile Lys Pro Thr Asn Lys Pro Thr Thr Lys

```

65                      70                      75                      80  
 Thr Thr Asn Lys Arg Asp Pro Lys Thr Pro Ala Lys Met Pro Lys Lys  
                             85                      90                      95  
 Glu Ile Ile Thr Asn  
                             100

<210> 11  
 <211> 42  
 <212> ADN  
 <213> Respiratory Syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(42)

<220>  
 <223> G1ACys

<400> 11  
 agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa                      42  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
   1                      5                      10

<210> 12  
 <211> 14  
 <212> PRT  
 <213> Respiratory Syncytial Virus (RSV)

<400> 12  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
   1                      5                      10

<210> 13  
 <211> 42  
 <212> ADN  
 <213> Respiratory Syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(42)

<220>  
 <223> G1BCys

<400> 13  
 agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa                      42  
 Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
   1                      5                      10

<210> 14  
 <211> 14  
 <212> PRT  
 <213> Respiratory Syncytial Virus (RSV)

<400> 14  
 Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
 1 5 10

<210> 15  
 <211> 42  
 <212> ADN  
 <213> Respiratory Syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(42)

<220>  
 <223>G1A

<400> 15  
 agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa 42  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
 1 5 10

<210> 16  
 <211> 14  
 <212> PRT  
 <213> Respiratory Syncytial Virus (RSV)

<400> 16  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
 1 5 10

<210> 17  
 <211> 42  
 <212> ADN  
 <213> Respiratory Syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(42)

<220>  
 <223>G1B

<400> 17  
 agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa 42  
 Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
 1 5 10

<210> 18  
<211> 14  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<400> 18  
Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
1 5 10

<210> 19  
<211> 14  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G1'A

<400> 19  
Ser Ile Asp Ser Asn Asn Pro Thr Xaa Trp Ala Ile Cys Lys  
1 5 10

<210> 20  
<211> 14  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G1'B

<400> 20  
Ser Ile Asp Gly Asn Asn Gln Leu Xaa Lys Ser Ile Cys Lys  
1 5 10

<210> 21  
<211> 14  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G1'AδC

<400> 21  
Ser Ile Asp Ser Asn Asn Pro Thr Xaa Trp Ala Ile Ser Lys

1 5 10

<210> 22  
<211> 14  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G1'B8C

<400> 22  
Ser Ile Asp Gly Asn Asn Gln Leu Xaa Lys Ser Ile Ser Lys  
1 5 10

<210> 23  
<211> 303  
<212> ADN  
<213> Respiratory Syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(303)

<220>  
<223> G2A8CF

<400> 23  
acc gtg aaa acc aaa aac acc acg acc acc cag acc cag ccg agc aaa 48  
Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys  
1 5 10 15  
  
ccg acc acc aaa cag cgt cag aac aaa ccg ccg aac aaa ccg aac aac 96  
Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn  
20 25 30  
  
gat tcc cat tcc gaa gtg tcc aac tcc gtg ccg agc agc atc tgc agc 144  
Asp Ser His Ser Glu Val Ser Asn Ser Val Pro Ser Ser Ile Cys Ser  
35 40 45  
  
aac aac ccg acc tgc tgg gcg atc agc aaa cgt atc ccg aac aaa aaa 192  
Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn Lys Lys  
50 55 60  
  
ccg ggc aaa aaa acc acg acc aaa ccg acc aaa aaa ccg acc ttc aaa 240  
Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys  
65 70 75 80  
  
acc acc aaa aaa gat cat aaa ccg cag acc acc aaa ccg aaa gaa gtg 288  
Thr Thr Lys Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val  
85 90 95

ccg acc acc aaa ccg  
Pro Thr Thr Lys Pro  
100

303

<210> 24  
<211> 101  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<400> 24  
Thr Val Lys Thr Lys Asn Thr Thr Thr Thr Gln Thr Gln Pro Ser Lys  
1 5 10 15  
Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro Pro Asn Lys Pro Asn Asn  
20 25 30  
Asp Ser His Ser Glu Val Ser Asn Ser Val Pro Ser Ser Ile Cys Ser  
35 40 45  
Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile Pro Asn Lys Lys  
50 55 60  
Pro Gly Lys Lys Thr Thr Thr Lys Pro Thr Lys Lys Pro Thr Phe Lys  
65 70 75 80  
Thr Thr Lys Lys Asp His Lys Pro Gln Thr Thr Lys Pro Lys Glu Val  
85 90 95  
Pro Thr Thr Lys Pro  
100

<210> 25  
<211> 51  
<212> ADN  
<213> Respiratory Syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(51)

<220>  
<223> G4A

<400> 25  
gtg ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc 48  
Val Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys  
1 5 10 15

aaa  
Lys 51

<210> 26  
<211> 17  
<212> PRT  
<213> Respiratory Syncytial Virus (RSV)

<400> 26

Val Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys  
1 5 10 15

Lys

<210> 27

<211> 51

<212> ADN

<213> Respiratory Syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(51)

<220>

<223> G4AδC

<400> 27

gtg ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc 48  
Val Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser  
1 5 10 15

aaa

Lys 51

<210> 28

<211> 17

<212> PRT

<213> Respiratory Syncytial Virus (RSV)

<400> 28

Val Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser  
1 5 10 15

Lys

<210> 29

<211> 51

<212> ADN

<213> Respiratory Syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(51)

<220>

<223> G4B

<400> 29

```
gtg ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc 48
Val Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys
  1             5             10             15
```

```
aaa
Lys 51
```

```
<210> 30
<211> 17
<212> PRT
<213> Respiratory Syncytial Virus (RSV)
```

```
<400> 30
Val Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys
  1             5             10             15
```

Lys

```
<210> 31
<211> 51
<212> ADN
<213> Respiratory syncytial Virus (RSV)
```

```
<220>
<221> CDS
<222> (1)..(51)
```

```
<220>
<223> G4BδC
```

```
<400> 31
gtg ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc 48
Val Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser
  1             5             10             15
```

```
aaa
Lys 51
```

```
<210> 32
<211> 17
<212> PRT
<213> Respiratory syncytial Virus (RSV)
```

```
<400> 32
Val Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser
  1             5             10             15
```

Lys

```
<210> 33
<211> 17
```

<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G4'A

<400> 33  
Val Pro Asp Ser Ile Asp Ser Asn Asn Pro Thr Xaa Trp Ala Ile Xaa  
1 5 10 15

Lys

<210> 34  
<211> 17  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G4'AδC

<400> 34  
Val Pro Ser Ser Ile Asp Ser Asn Asn Pro Thr Xaa Trp Ala Ile Ser  
1 5 10 15

Lys

<210> 35  
<211> 17  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>  
<223> Xaa means Orn.

<220>  
<223> G4'B

<400> 35  
Val Pro Asp Ser Ile Asp Gly Asn Asn Gln Leu Xaa Lys Ser Ile Xaa  
1 5 10 15

Lys

<210> 36  
 <211> 17  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <223> Xaa means Orn.

<220>  
 <223> G4'BδC

<400> 36  
 Val Pro Ser Ser Ile Asp Gly Asn Asn Gln Leu Xaa Lys Ser Ile Ser  
 1 5 10 15

Lys

<210> 37  
 <211> 183  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(183)

<220>  
 <223> G200A

<400> 37  
 cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
 Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
 1 5 10 15  
 ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
 Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
 20 25 30  
 ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa 144  
 Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
 35 40 45  
 cgt atc ccg aac aaa aaa ccg ggc aaa aaa acc acg acc 183  
 Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr Thr Thr  
 50 55 60

<210> 38  
 <211> 61  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 38  
 Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro

1	5	10	15
Pro Asn Lys	Pro Asn Asn Asp	Phe His Phe Glu Val	Phe Asn Phe Val
	20	25	30
Pro Cys Ser	Ile Cys Ser Asn Asn	Pro Thr Cys Trp	Ala Ile Cys Lys
	35	40	45
Arg Ile Pro	Asn Lys Lys Pro Gly	Lys Lys Thr Thr	Thr
	50	55	60

<210> 39  
 <211> 177  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(177)  
 <220>  
 <223> G198A

PF82PCTSEQ/dln

<400> 39	
cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg	48
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro	
1 5 10 15	
ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg	96
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val	
20 25 30	
ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa	144
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys	
35 40 45	
cgt atc ccg aac aaa aaa ccg ggc aaa aaa acc	177
Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr	
50 55	

<210> 40  
 <211> 59  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 40	
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro	
1 5 10 15	
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val	
20 25 30	
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys	
35 40 45	

Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr  
50 55

<210> 41  
<211> 171  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(171)

<220>  
<223> G196A

<400> 41  
cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15  
ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30  
ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa 144  
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
35 40 45  
cgt atc ccg aac aaa aaa ccg ggc aaa 171  
Arg Ile Pro Asn Lys Lys Pro Gly Lys  
50 55

<210> 42  
<211> 57  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 42  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30  
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
35 40 45  
Arg Ile Pro Asn Lys Lys Pro Gly Lys  
50 55

<210> 43  
<211> 165  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(165)

<220>  
<223> G194A

<400> 43  
cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15  
ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30  
ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa 144  
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
35 40 45  
cgt atc ccg aac aaa aaa ccg 165  
Arg Ile Pro Asn Lys Lys Pro  
50 55

<210> 44  
<211> 55  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 44  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30  
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
35 40 45  
Arg Ile Pro Asn Lys Lys Pro  
50 55

<210> 45  
<211> 159  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(159)

<220>  
<223> G192A

<400> 45

cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa 144  
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
35 40 45

cgt atc ccg aac aaa  
Arg Ile Pro Asn Lys 159  
50

<210> 46

<211> 53

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 46

Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
35 40 45

Arg Ile Pro Asn Lys  
50

<210> 47

<211> 153

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(153)

<220>

<223> G6A

<400> 47

cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val

	20	25	30	
ccg tgc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa				144
Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys				
	35	40	45	
cggt atc ccg				153
Arg Ile Pro				
	50			

<210> 48  
 <211> 51  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 48  
 Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
 1 5 10 15  
 Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
 20 25 30  
 Pro Cys Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys  
 35 40 45  
 Arg Ile Pro  
 50

<210> 49  
 <211> 99  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(99)

<220>  
 <223> G7A

<400> 49  
 aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg ccg tgc 48  
 Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys  
 1 5 10 15  
 agc atc tgc agc aac aac ccg acc tgc tgg gcg atc tgc aaa cggt atc 96  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile  
 20 25 30  
 ccg 99  
 Pro

<210> 50  
 <211> 33

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 50

Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Cys  
1 5 10 15

Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Cys Lys Arg Ile  
20 25 30

Pro

<210> 51

<211> 183

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(183)

<220>

<223>G200AδC

<400> 51

cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa 144  
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45

cgt atc ccg aac aaa aaa ccg ggc aaa aaa acc acg acc 183  
Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr Thr Thr  
50 55 60

<210> 52

<211> 61

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 52

Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45

Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr Thr Thr  
50 55 60

<210> 53  
<211> 177  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(177)

<220>  
<223> G198A5C

<400> 53  
cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15  
ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30  
ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa 144  
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45  
cgt atc ccg aac aaa aaa ccg ggc aaa aaa acc 177  
Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr  
50 55

<210> 54  
<211> 59  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 54  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30  
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45  
Arg Ile Pro Asn Lys Lys Pro Gly Lys Lys Thr  
50 55

<210> 55  
<211> 171  
<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(171)

<220>

<223> G196A8C

<400> 55

cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa 144  
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45

cgt atc ccg aac aaa aaa ccg ggc aaa 171  
Arg Ile Pro Asn Lys Lys Pro Gly Lys  
50 55

<210> 56

<211> 57

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 56

Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45

Arg Ile Pro Asn Lys Lys Pro Gly Lys  
50 55

<210> 57

<211> 165

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(165)

<220>

<223> G194A8C

<400> 57

cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa 144  
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45

cgt atc ccg aac aaa aaa ccg 165  
Arg Ile Pro Asn Lys Lys Pro  
50 55

<210> 58

<211> 55

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 58

Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
35 40 45

Arg Ile Pro Asn Lys Lys Pro  
50 55

<210> 59

<211> 159

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(159)

<220>

<223> G192AδC

<400> 59

cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg 48  
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
1 5 10 15

ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg 96  
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val

20	25	30	
ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa	144		
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys			
35 40 45			
cg t atc ccg aac aaa	159		
Arg Ile Pro Asn Lys			
50			

<210> 60  
 <211> 53  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 60	
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro	
1 5 10 15	
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val	
20 25 30	
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys	
35 40 45	
Arg Ile Pro Asn Lys	
50	

<210> 61  
 <211> 153  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(153)

<220>  
 <223> G6AδC

<400> 61	
cag acc cag ccg agc aaa ccg acc acc aaa cag cgt cag aac aaa ccg	48
Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro	
1 5 10 15	
ccg aac aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg	96
Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val	
20 25 30	
ccg agc agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa	144
Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys	
35 40 45	
cg t atc ccg	153
Arg Ile Pro	

50

<210> 62  
 <211> 51  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 62  
 Gln Thr Gln Pro Ser Lys Pro Thr Thr Lys Gln Arg Gln Asn Lys Pro  
 1 5 10 15  
 Pro Asn Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val  
 20 25 30  
 Pro Ser Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys  
 35 40 45  
 Arg Ile Pro  
 50

<210> 63  
 <211> 99  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1) .. (99)  
 <220>  
 <223> G7AδC

<400> 63  
 aaa ccg aac aac gat ttc cat ttc gaa gtg ttc aac ttc gtg ccg agc 48  
 Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser  
 1 5 10 15  
 agc atc tgc agc aac aac ccg acc tgc tgg gcg atc agc aaa cgt atc 96  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile  
 20 25 30  
 ccg 99  
 Pro

<210> 64  
 <211> 33  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 64  
 Lys Pro Asn Asn Asp Phe His Phe Glu Val Phe Asn Phe Val Pro Ser  
 1 5 10 15  
 Ser Ile Cys Ser Asn Asn Pro Thr Cys Trp Ala Ile Ser Lys Arg Ile

20

25

30

Pro

<210> 65

<211> 183

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(183)

<220>

<223> G200B

<400> 65

agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa 144  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

acc atc ccg agc aac aaa ccg aaa aag aaa ccg acc atc 183  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro Thr Ile  
50 55 60

<210> 66

<211> 61

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 66

Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro Thr Ile  
50 55 60

<210> 67

<211> 177

<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(177)

<220>  
<223> G198B

<400> 67  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30  
ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa 144  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45  
acc atc ccg agc aac aaa ccg aaa aag aaa ccg 177  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro  
50 55

<210> 68  
<211> 59  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 68  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro  
50 55

<210> 69  
<211> 171  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(171)

<220>

<223> G196B

<400> 69

agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa 144  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

acc atc ccg agc aac aaa ccg aaa aag 171  
Thr Ile Pro Ser Asn Lys Pro Lys Lys  
50 55

<210> 70

<211> 57

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 70

Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

Thr Ile Pro Ser Asn Lys Pro Lys Lys  
50 55

<210> 71

<211> 165

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(165)

<220>

<223> G194B

<400> 71

agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa 144  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

acc atc ccg agc aac aaa ccg 165  
Thr Ile Pro Ser Asn Lys Pro  
50 55

<210> 72

<211> 55

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 72

Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

Thr Ile Pro Ser Asn Lys Pro  
50 55

<210> 73

<211> 159

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(159)

<220>

<223> G192B

<400> 73

agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa 144  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

acc atc ccg agc aac  
Thr Ile Pro Ser Asn  
50

159

<210> 74  
<211> 53  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 74  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

Thr Ile Pro Ser Asn  
50

<210> 75  
<211> 153  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1) .. (153)

<220>  
<223> G6B

<400> 75  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc tgc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa 144  
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys  
35 40 45

acc atc ccg  
Thr Ile Pro  
50 153

<210> 76  
<211> 51  
<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 76

```
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro
 1              5              10              15
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val
      20              25              30
Pro Cys Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys
      35              40              45
Thr Ile Pro
      50
```

<210> 77

<211> 99

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(99)

<220>

<223> G7B

<400> 77

```
aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg ccc tgc   48
Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys
 1              5              10              15

agc atc tgc ggc aac aac cag ctg tgc aaa agc atc tgc aaa acc atc   96
Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys Thr Ile
      20              25              30

ccg
Pro                                          99
```

<210> 78

<211> 33

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 78

```
Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Cys
 1              5              10              15

Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Cys Lys Thr Ile
      20              25              30

Pro
```

<210> 79  
<211> 183  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(183)

<220> G200BdC  
<223>

<400> 79  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30  
ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa 144  
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45  
acc atc ccg agc aac aaa ccg aaa aag aaa ccg acc atc 183  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro Thr Ile  
50 55 60

<210> 80  
<211> 61  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 80  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30  
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro Thr Ile  
50 55 60

<210> 81  
<211> 177  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(177)

<220>  
<223> G198BδC

<400> 81  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30  
ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa 144  
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45  
acc atc ccg agc aac aaa ccg aaa aag aaa ccg 177  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro  
50 55

<210> 82  
<211> 59  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 82  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30  
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45  
Thr Ile Pro Ser Asn Lys Pro Lys Lys Lys Pro  
50 55

<210> 83  
<211> 171  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(171)

<220>  
<223> G196BδC

<400> 83  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro

1	5	10	15	
ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg	96			
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val				
20	25	30		
ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa	144			
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys				
35	40	45		
acc atc ccg agc aac aaa ccg aaa aag	171			
Thr Ile Pro Ser Asn Lys Pro Lys Lys				
50	55			

<210> 84  
 <211> 57  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 84	
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro	
1	15
5	10
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val	
20	25
30	
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys	
35	40
45	
Thr Ile Pro Ser Asn Lys Pro Lys Lys	
50	55

<210> 85  
 <211> 183  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(183)

<220>  
 <223> G200V

<400> 85	
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca	48
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro	
1	15
5	10
cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt	96
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val	
20	25
30	
ccc tgc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat	144
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His	

35 40 45  
att gag acg gaa aga gca cca agc aga gca cca aca atc 183  
Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro Thr Ile  
50 55 60

<210> 86  
<211> 61  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 86  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45

Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro Thr Ile  
50 55 60

<210> 87  
<211> 165  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(165)

<220>  
<223> G194B8C

<400> 87  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa 144  
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45

acc atc ccg agc aac aaa ccg 165  
Thr Ile Pro Ser Asn Lys Pro  
50 55

<210> 88

<211> 55  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 88  
 Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
     1                    5                    10                    15  
 Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
             20                    25                    30  
 Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
             35                    40                    45  
 Thr Ile Pro Ser Asn Lys Pro  
     50                    55

<210> 89  
 <211> 159  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(159)

<220>  
 <223> G192B8C

<400> 89  
 agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
 Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
     1                    5                    10                    15  
 ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
 Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
             20                    25                    30  
 ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa 144  
 Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
             35                    40                    45  
 acc atc ccg agc aac  
 Thr Ile Pro Ser Asn 159  
     50

<210> 90  
 <211> 53  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 90  
 Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
     1                    5                    10                    15

Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45

Thr Ile Pro Ser Asn  
50

<210> 91  
<211> 153  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(153)

<220>  
<223> G6B8C

<400> 91  
agc acc cag acc aac aaa ccg agc acc aaa agc cgt agc aaa aac ccg 48  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

ccg aaa aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg 96  
Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

ccc agc agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa 144  
Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45

acc atc ccg 153  
Thr Ile Pro  
50

<210> 92  
<211> 51  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 92  
Ser Thr Gln Thr Asn Lys Pro Ser Thr Lys Ser Arg Ser Lys Asn Pro  
1 5 10 15

Pro Lys Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val  
20 25 30

Pro Ser Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys  
35 40 45

Thr Ile Pro  
50

<210> 93  
 <211> 99  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(99)

<220>  
 <223> G7B8C

<400> 93  
 aaa ccg aaa gat gat tac cac ttc gaa gtg ttc aac ttc gtg ccc agc 48  
 Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser  
 1 5 10 15  
 agc atc tgc ggc aac aac cag ctg tgc aaa agc atc agc aaa acc atc 96  
 Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys Thr Ile  
 20 25 30  
 ccg 99  
 Pro

<210> 94  
 <211> 33  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 94  
 Lys Pro Lys Asp Asp Tyr His Phe Glu Val Phe Asn Phe Val Pro Ser  
 1 5 10 15  
 Ser Ile Cys Gly Asn Asn Gln Leu Cys Lys Ser Ile Ser Lys Thr Ile  
 20 25 30  
 Pro

<210> 95  
 <211> 303  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(303)

<220>  
 <223> G2V

<400> 95

```

caa aac aga aaa atc aaa ggt caa tca aca cta cca gcc aca aga aaa 48
Gln Asn Arg Lys Ile Lys Gly Gln Ser Thr Leu Pro Ala Thr Arg Lys
 1           5           10           15

cca cca att aat cca tca gga agc atc cca cca gaa aac cat caa gac 96
Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His Gln Asp
          20           25           30

cac aac aac ttc caa aca ctc ccc tat gtt ccc tgc agt aca tgt gaa 144
His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys Glu
        35           40           45

ggt aat ctt gca tgc tta tca ctc tgc cat att gag acg gaa aga gca 192
Gly Asn Leu Ala Cys Leu Ser Leu Cys His Ile Glu Thr Glu Arg Ala
    50           55           60

cca agc aga gca cca aca atc acc ctc aaa aag aca cca aaa cca aaa 240
Pro Ser Arg Ala Pro Thr Ile Thr Leu Lys Lys Thr Pro Lys Pro Lys
    65           70           75           80

acc aca aaa aag cca acc aag aca aca atc cat cac aga acc agc cca 288
Thr Thr Lys Lys Pro Thr Lys Thr Thr Ile His His Arg Thr Ser Pro
          85           90           95

gaa acc aaa ctg caa
Glu Thr Lys Leu Gln
          100

```

<210> 96

<211> 101

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 96

```

Gln Asn Arg Lys Ile Lys Gly Gln Ser Thr Leu Pro Ala Thr Arg Lys
 1           5           10           15

Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His Gln Asp
    20           25           30

His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys Ser Thr Cys Glu
    35           40           45

Gly Asn Leu Ala Cys Leu Ser Leu Cys His Ile Glu Thr Glu Arg Ala
    50           55           60

Pro Ser Arg Ala Pro Thr Ile Thr Leu Lys Lys Thr Pro Lys Pro Lys
    65           70           75           80

Thr Thr Lys Lys Pro Thr Lys Thr Thr Ile His His Arg Thr Ser Pro
    85           90           95

Glu Thr Lys Leu Gln
    100

```

<210> 97

<211> 303  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(303)

<220>  
<223> G2V8C

<400> 97  
caa aac aga aaa atc aaa ggt caa tca aca cta cca gcc aca aga aaa 48  
Gln Asn Arg Lys Ile Lys Gly Gln Ser Thr Leu Pro Ala Thr Arg Lys  
1 5 10 15  
cca cca att aat cca tca gga agc atc cca cca gaa aac cat caa gac 96  
Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His Gln Asp  
20 25 30  
cac aac aac ttc caa aca ctc ccc tat gtt ccc agc agt aca tgt gaa 144  
His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu  
35 40 45  
ggt aat ctt gca tgc tta tca ctc agc cat att gag acg gaa aga gca 192  
Gly Asn Leu Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg Ala  
50 55 60  
cca agc aga gca cca aca atc acc ctc aaa aag aca cca aaa cca aaa 240  
Pro Ser Arg Ala Pro Thr Ile Thr Leu Lys Lys Thr Pro Lys Pro Lys  
65 70 75 80  
acc aca aaa aag cca acc aag aca aca atc cat cac aga acc agc cca 288  
Thr Thr Lys Lys Pro Thr Lys Thr Thr Ile His His Arg Thr Ser Pro  
85 90 95  
gaa acc aaa ctg caa 303  
Glu Thr Lys Leu Gln  
100

<210> 98  
<211> 101  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 98  
Gln Asn Arg Lys Ile Lys Gly Gln Ser Thr Leu Pro Ala Thr Arg Lys  
1 5 10 15  
Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro Pro Glu Asn His Gln Asp  
20 25 30  
His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser Ser Thr Cys Glu  
35 40 45  
Gly Asn Leu Ala Cys Leu Ser Leu Ser His Ile Glu Thr Glu Arg Ala

50

55

60

Pro Ser Arg Ala Pro Thr Ile Thr Leu Lys Lys Thr Pro Lys Pro Lys  
65 70 75 80

Thr Thr Lys Lys Pro Thr Lys Thr Thr Ile His His Arg Thr Ser Pro  
85 90 95

Glu Thr Lys Leu Gln  
100

<210> 99

<211> 177

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(177)

<220>

<223> G198V

<400> 99

cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

ccc tgc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat 144  
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45

att gag acg gaa aga gca cca agc aga gca cca 177  
Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro  
50 55

<210> 100

<211> 59

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 100

Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45

Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro  
50 55

<210> 101  
<211> 171  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(171)

<220>  
<223> G196V

<400> 101  
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
ccc tgc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat 144  
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45  
att gag acg gaa aga gca cca agc aga 171  
Ile Glu Thr Glu Arg Ala Pro Ser Arg  
50 55

<210> 102  
<211> 57  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 102  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45  
Ile Glu Thr Glu Arg Ala Pro Ser Arg  
50 55

<210> 103  
<211> 165  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(165)

<220>  
<223> G194V

<400> 103  
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
ccc tgc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat 144  
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45  
att gag acg gaa aga gca cca 165  
Ile Glu Thr Glu Arg Ala Pro  
50 55

<210> 104  
<211> 55  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 104  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
35 40 45  
Ile Glu Thr Glu Arg Ala Pro  
50 55

<210> 105  
<211> 159  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(159)

<220>  
<223> G192V

```

<400> 105
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro
  1           5           10           15

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val
          20           25           30

ccc tgc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat 144
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His
        35           40           45

att gag acg gaa aga
Ile Glu Thr Glu Arg
    50
159

```

```

<210> 106
<211> 53
<212> PRT
<213> Respiratory syncytial Virus (RSV)

```

```

<400> 106
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro
  1           5           10           15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val
          20           25           30

Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His
        35           40           45

Ile Glu Thr Glu Arg
    50

```

```

<210> 107
<211> 153
<212> ADN
<213> Respiratory syncytial Virus (RSV)

```

```

<220>
<221> CDS
<222> (1)..(153)

<220>
<223> G6V

```

```

<400> 107
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro
  1           5           10           15

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val

```

	20		25		30	
ccc tgc agt	aca tgt gaa ggt	aat ctt gca tgc	tta tca ctc tgc	cat	144	
Pro Cys Ser	Thr Cys Glu Gly	Asn Leu Ala Cys	Leu Ser Leu Cys	His		
	35	40	45			
att gag acg					153	
Ile Glu Thr						
	50					

<210> 108  
 <211> 51  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 108	
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro	
1 5 10 15	
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val	
20 25 30	
Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His	
35 40 45	
Ile Glu Thr	
50	

<210> 109  
 <211> 99  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(99)

<220>  
 <223> G7V

<400> 109	
aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt ccc tgc	48
Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys	
1 5 10 15	
agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat att gag	96
Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His Ile Glu	
20 25 30	
acg	99
Thr	

<210> 110  
 <211> 33

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 110

Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Cys  
1 5 10 15

Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His Ile Glu  
20 25 30

Thr

<210> 111

<211> 183

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(183)

<220>

<223> G200V5C

<400> 111

cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 144  
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45

att gag acg gaa aga gca cca agc aga gca cca aca atc 183  
Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro Thr Ile  
50 55 60

<210> 112

<211> 61

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 112

Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His

35 40 45  
Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro Thr Ile  
50 55 60

<210> 113  
<211> 177  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(177)

<220>  
<223> G198V8C

<400> 113  
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 144  
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45  
att gag acg gaa aga gca cca agc aga gca cca 177  
Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro  
50 55

<210> 114  
<211> 59  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 114  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45  
Ile Glu Thr Glu Arg Ala Pro Ser Arg Ala Pro  
50 55

<210> 115  
<211> 171

<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(171)

<220>  
<223> G196VδC

<400> 115  
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 144  
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45  
att gag acg gaa aga gca cca agc aga 171  
Ile Glu Thr Glu Arg Ala Pro Ser Arg  
50 55

<210> 116  
<211> 57  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 116  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30  
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45  
Ile Glu Thr Glu Arg Ala Pro Ser Arg  
50 55

<210> 117  
<211> 165  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(165)

<220>

<223> G194V8C

<400> 117

cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96  
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 144  
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45

att gag acg gaa aga gca cca 165  
Ile Glu Thr Glu Arg Ala Pro  
50 55

<210> 118

<211> 55

<212> PRT

<213> Respiratory syncytial Virus (RSV)

<400> 118

Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45

Ile Glu Thr Glu Arg Ala Pro  
50 55

<210> 119

<211> 159

<212> ADN

<213> Respiratory syncytial Virus (RSV)

<220>

<221> CDS

<222> (1)..(159)

<220>

<223> G192V8C

<400> 119

cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

```

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val
      20              25              30

ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 144
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His
      35              40              45

att gag acg gaa aga 159
Ile Glu Thr Glu Arg
      50

```

```

<210> 120
<211> 53
<212> PRT
<213> Respiratory syncytial Virus (RSV)

```

```

<400> 120
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro
 1              5              10              15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val
      20              25              30

Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His
      35              40              45

Ile Glu Thr Glu Arg
      50

```

```

<210> 121
<211> 153
<212> ADN
<213> Respiratory syncytial Virus (RSV)

```

```

<220>
<221> CDS
<222> (1)..(153)

```

```

<220>
<223> G6V8C

```

```

<400> 121
cta cca gcc aca aga aaa cca cca att aat cca tca gga agc atc cca 48
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro
 1              5              10              15

cca gaa aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt 96
Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val
      20              25              30

ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 144
Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His
      35              40              45

```

att gag acg 153  
Ile Glu Thr  
50

<210> 122  
<211> 51  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 122  
Leu Pro Ala Thr Arg Lys Pro Pro Ile Asn Pro Ser Gly Ser Ile Pro  
1 5 10 15

Pro Glu Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val  
20 25 30

Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
35 40 45

Ile Glu Thr  
50

<210> 123  
<211> 99  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(99)

<220>  
<223> G7VδC

<400> 123  
aac cat caa gac cac aac aac ttc caa aca ctc ccc tat gtt ccc agc 48  
Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser  
1 5 10 15

agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat att gag 96  
Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His Ile Glu  
20 25 30

acg 99  
Thr

<210> 124  
<211> 33  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 124  
Asn His Gln Asp His Asn Asn Phe Gln Thr Leu Pro Tyr Val Pro Ser  
1 5 10 15

Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His Ile Glu  
 20 25 30

Thr

<210> 125  
 <211> 51  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(51)

<220>  
 <223> G4V  
 <400> 125  
 gtt ccc tgc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc 48  
 Val Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys  
 1 5 10 15  
 cat 51  
 His

<210> 126  
 <211> 17  
 <212> PRT  
 <213> Respiratory syncytial Virus (RSV)

<400> 126  
 Val Pro Cys Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys  
 1 5 10 15

His

<210> 127  
 <211> 51  
 <212> ADN  
 <213> Respiratory syncytial Virus (RSV)

<220>  
 <221> CDS  
 <222> (1)..(51)

<220>  
 <223> G4VδC

<400> 127  
 gtt ccc agc agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc 48

Val Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser  
1 5 10 15

cat  
His

51

<210> 128  
<211> 17  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 128

Val Pro Ser Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser  
1 5 10 15

His

<210> 129  
<211> 17  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>

<223> Xaa means orn.

<220>

<223> G4'V

<400> 129

Val Pro Asp Ser Thr Asp Glu Gly Asn Leu Ala Xaa Leu Ser Leu Xaa  
1 5 10 15

His

<210> 130  
<211> 17  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>

<223> Xaa means orn.

<220>

<223> G4'vδC

<400> 130

Val Pro Ser Ser Thr Asp Glu Gly Asn Leu Ala Xaa Leu Ser Leu Ser  
1 5 10 15

His

<210> 131  
<211> 42  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(42)

<220>  
<223> G1V

<400> 131  
agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc tgc cat 42  
Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
1 5 10

<210> 132  
<211> 14  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 132  
Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Cys His  
1 5 10

<210> 133  
<211> 42  
<212> ADN  
<213> Respiratory syncytial Virus (RSV)

<220>  
<221> CDS  
<222> (1)..(42)

<220>  
<223> G1VδC

<400> 133  
agt aca tgt gaa ggt aat ctt gca tgc tta tca ctc agc cat 42  
Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His  
1 5 10

<210> 134  
<211> 14  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<400> 134  
Ser Thr Cys Glu Gly Asn Leu Ala Cys Leu Ser Leu Ser His

1 5 10

<210> 135  
<211> 14  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>  
<223> Xaa means orn.

<220>  
<223> G1'V8C

<400> 135  
Ser Thr Asp Glu Gly Asn Leu Ala Xaa Leu Ser Leu Ser His  
1 5 10

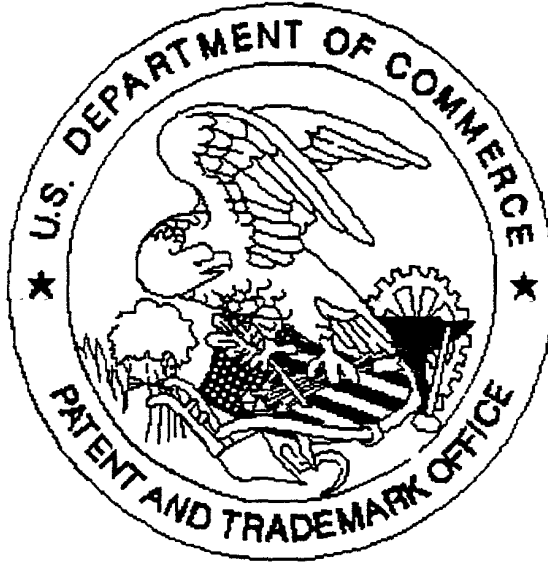
<210> 136  
<211> 15  
<212> PRT  
<213> Respiratory syncytial Virus (RSV)

<220>  
<223> Xaa means orn.

<220>  
<223> G1'

<400> 136  
Ser Ile Asp Ser Asn Asn Pro Thr Xaa Trp Ala Ile Ser Lys Cys  
1 5 10 15

United States Patent & Trademark Office  
Office of Initial Patent Examination -- Scanning Division



Application deficiencies found during scanning:

☒ Page(s) \_\_\_\_\_ of \_\_\_\_\_ were not present  
for scanning. (Document title)

*pages 19 - 73 claims missing*

☒ Page(s) \_\_\_\_\_ of \_\_\_\_\_ were not present  
for scanning. (Document title)

*pages 1 - 15 sequence listing missing*

☐ *Scanned copy is best available.*